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THE FAR EASTERN REVIEW

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Engineering
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PEKING-MUKDEN LINE

YUAN SHIH-K'AI,
PRESIDENT OF THE REPUBLIC OF CHINA
(From his latest photograph)

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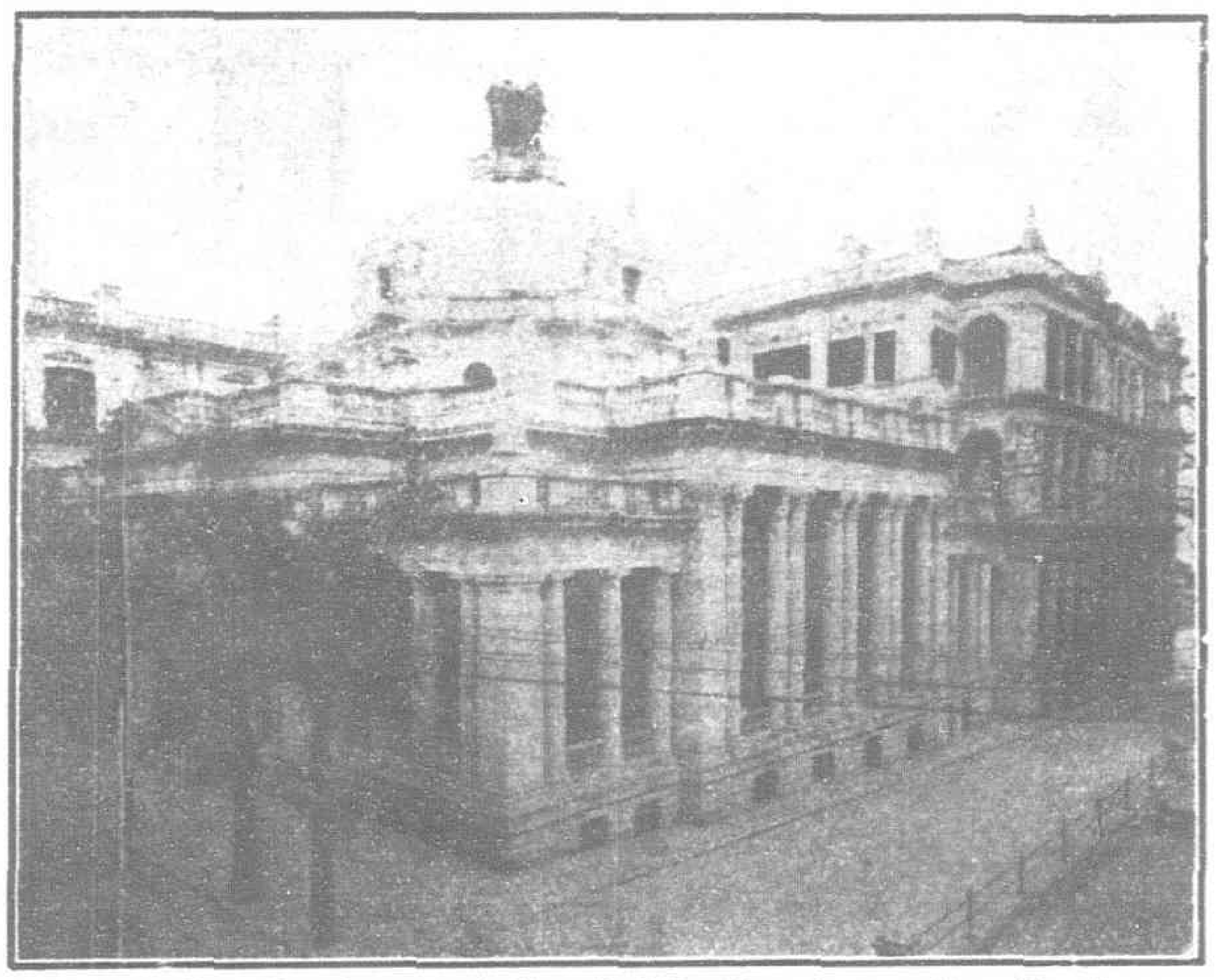

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THE FAR EASTERN REVIEW
COMMERCE :-: ENGINEERING :-: FINANCE

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CHINA'S FINANCIAL CONDITION

THE CRISP LOAN AND CHINA'S CREDIT

Some of the main issues in connection with China's financial condition have been obscured by the dust of disputation that has been raised in regard to the Crisp Loan of £10,000,000, a moiety of which was floated in London at the end of September. It is desirable, therefore, that a calm and dispassionate statement of the present condition of China's finances, with a brief retrospect of China's financial history since the establishment of the Republic, should be presented to the reader to enable an impartial judgment to be formed in regard to China's credit and her financial prospects for the future. We are, fortunately, in possession of information from authoritative sources, not generally available, that will largely assist in throwing light upon points that have hitherto been shrouded in uncertainty or that have been overlooked in the acrimonious disputation that followed the conclusion of the loan floated by Messrs. Birch Crisp & Co.

Readers of the FAR EASTERN REVIEW will remember that in our Financial and Historical Review of the Chinese Revolution, published last April, we showed that the rock upon which the Manchu Dynasty split was finance. Had Yuan Shih-k'ai been enabled to borrow money from foreign sources it is extremely doubtful whether there would have been a Republic in existence to-day. On the other hand had financial support been withheld from Yuan Shih-k'ai and given to the Revolutionaries the latter would almost certainly have carried the war into the North, and the final settlement would have been much less favorable to the Manchus. But neither side had the funds requisite for a protraction of the war, and the Customs revenues being very wisely made unavailable either to the Imperialists or the Revolutionaries (to which important point we shall revert in due time) a continuance of hostilities became practically impossible, and peace was concluded. No purpose would be served by recapitulating the various financial expedients adopted by each side during the conflict except to note that the Nanking Provisional Government issued a number of eight per cent. bonds which became a charge on China when Yuan Shih-k'ai's appointment as Provisional President was confirmed on February 15.

The new Government under Provisional President Yuan Shih-k'ai, which was established after Dr. Sun Yat-sen and his associates at Nanking had resigned, was faced with innumerable problems, not the least being the necessity of disbanding the troops that had been raised during the Revolution, and re-establishing the shattered machinery of administration. But the Treasury was empty. The contributions from the Provinces upon which the Central Government had been wont to rely had ceased, and it was realized that for many months to come it would be impossible to depend upon any return from internal taxation sufficient to meet the ordinary expenses of administration, much less the extraordinary expenditure involved by the maintenance of hundreds of thousands of soldiers who could not be disbanded as their pay was in arrear; to say nothing of the payment of the Indemnity and the service of foreign loans. To disband the troops in those circumstances would have been to flood the country with dissatisfied and penniless men who would have been a serious menace to the new order. Foreign financial aid was the only way out of the difficulty. Active negotiations were accordingly entered into with the Four Banking Groups comprised of the Hongkong and Shanghai Banking Corporation, the Banque de l'Indo-Chine, the Deutsche-Asiatische Bank, and Mr. Willard D. Straight, representing the American Group. As a result of these negotiations Provisional President Yuan Shih-k'ai signed a letter on March 9, 1912, arranging for monthly payments to cover current needs, and giving the Group a firm option upon similar loans and a proposed reconstruction loan of £60,000,000. It should be mentioned that the Groups had already, on February 28, made an advance to the Provisional Government of Tls. 2,000,000. A further sum of Tls. 1,100,000 was handed over to the Provisional Government early in March, and negotiations were about to be opened on the final reconstruction loan agreement, when the Groups learned on March 14 that the Premier, Tang Shao-yi, was negotiating with a Belgian Group for an independent loan of £1,000,000. The Four Banking Groups protested, but the Belgian loan was accepted, and the Four Banking Groups thereupon suspended further payments.

Negotiations, were not, however, finally broken off, and it was hoped that an arrangement would be possible whereby the Groups, which had been augmented by the inclusion of Russian and Japanese, Banks, would be able to advance a sum sufficient to provide China with the funds necessary to pay off the troops and establish the administration on a firm basis. The Six Banking Groups, to safeguard themselves, demanded:

First, that the purposes for which the funds were required should be stated by the Chinese Government and approved by the Groups.

Second, that China should adopt a system of audit which would insure the effective expenditure of loan funds for the purposes specified.

Third, that the salt taxes to be hypothecated for the service of this loan should be administered either by the existing Maritime Customs organization or by a separate service like the Customs under foreign direction, thus safeguarding the proper administration of the security despite the possible continuation or recurrence of unsettled conditions in China.

These terms proved unacceptable to the Provisional Government and an endeavor was made to raise a Patriotic Loan among the Chinese. This failed, and the negotiations with the Six Banking Groups dragged on and small sums were advanced from time to time, the total reaching £1,800,000. China would not, however, give way in regard to the demands of the Groups, and matters reached a deadlock. Attempts had been made from time to time to arrange loans with foreign financiers apart from the Groups, but as it was generally known that the Governments of the six countries concerned gave their official countenance and support to the Groups, these endeavors were for a long time unsuccessful.

At last, however, an agent was found in Peking who undertook to secure £10,000,000 on the London market. The promotion of the loan was placed in the hands of Mr. C. Birch Crisp, of Messrs. Birch Crisp & Co. These negotiations, it may be mentioned, were kept secret in the earlier stages, and the International Group had no knowledge that a loan was being arranged on the security of the Salt Gabelle, the revenue of which was to be the security for the loan they were themselves about to negotiate with the Provisional Government. When Mr. Crisp was asked to undertake the promotion of the £10,000,000 Loan he went to the Chinese Legation in London and there talked the matter over with Dr. G. E. Morrison, the Political Adviser to China, who had just arrived in the British capital. The assurances he received from Dr. Morrison satisfied him, and he decided to proceed with the promotion. After ascertaining that the loan would be supported by the City he informed the Foreign Office that his firm contemplated concluding a contract with China. The Foreign Office in return notified him that they could not support the loan, and advised him to abandon the promotion. Mr. Crisp asked the Foreign Office to write him a formal letter asking him for reasons of State to abstain from negotiations. This letter was not given, and the contract, a copy of which we issued as a Special Supplement to subscribers on October 19, and now publish in this issue, was signed on August 30. Another interview with the Foreign Office authorities took place at which it was arranged that Mr. Crisp would not proceed to the issue of the loan without first notifying the Foreign Office. This notification was sent in due course, but no communication was received in reply from the Foreign Office. The loan was then issued. The public subscribed, for forty per cent. and the underwriters were left to take the remaining 60 per cent. The original intention was to open the loan on September 27 and close it on September 28, but the loan did not actually close until September 30. Usually China loans close in at most one and a half or two hours.

PRO AND CON.

Having given a brief *resumé* of the history of the Crisp Loan we may consider the arguments advanced in its support and reasons given by those who regard it as involving a serious impairment of China's credit.

The supporters of the new loan declare that the terms and conditions offered and insisted upon by the Six Banking Groups could not be accepted by China on any consideration. For one reason Japan and Russia are in the consortium and one of their requirements was that no loan proceeds should be applied for any purposes in their respective spheres of influence in Manchuria, Mongolia, the New Dominion and Chinese Turkestan. Japan and Russia put forward this requirement as a condition for equal participation at the Conference of the six banks at Paris. They declared that they could not associate themselves with lending money to China to employ in the localities mentioned, and so necessitate expenditure, on the part of Japan and Russia. The Governments of Russia and Japan subsequently withdrew these conditions, but they are speciously declared by the Crisp Loan supporters to stand on record and to be more or less effective, whilst the agreement made among the Six Groups themselves for joint action in China stands terminable only by one year's notice. They allege, too, upon what grounds it is difficult to find, that the Bankers themselves broke their agreement with China, and not China with the Bankers; China, they argue, entered into the agreement with the Bankers for commercial purposes and never foresaw that political conditions would be imported into it. The actual claims made by the Groups supported by their respective Ministers were presumptuous, they state, and were as follow: (1). That the Groups should have the exclusive right to conduct China's financial operations for the next five years. (2). That the Belgian Loan of £1,250,000 should not be repaid from the proceeds of any loan entered into by the Chinese Government. (3). That the security should be the Salt Gabelle, placed under foreign control.

These conditions are held by the Crisp Loan promoters to be impracticable, and it is declared that no Advisory Council would ever agree to them, whilst Chinese nationalism would be destroyed by foreign supervision of the Salt Gabelle! This represents the point of view of those who welcome the new loan in the belief that it has secured China's independence of the Six Banking Groups!

On the other hand it is declared that China's best interests would be served by transacting all her business through the Six Banking Groups. In the present position of China's credit she has not sufficient security for the amount that it will be necessary for her to borrow. It will therefore be imperative to build up the revenues in order to provide a margin for future borrowing. The Groups desired to prevent over-borrowing. They desired to utilise their unique facilities in the money markets of the world to place Chinese Bonds at a price that would maintain China's credit. In order to maintain her credit, they felt, it would be necessary for the financial agents to have a certain general advisory capacity during the contract as it would obviously be prejudicial to China's credit if she used borrowed money for administration expenditure (as she must at present) and employed her revenues in ways that did not enhance the securities upon which her borrowing power is based. The Groups in effect said to China: "We will lend you what money you require, but it is necessary that your credit should be maintained. Your credit can only be maintained by an expenditure of your receipts from loans or revenues over and above cost of administration in such a manner that the value of the securities upon which your credit rests is enhanced. We must therefore be placed in a position to maintain your credit by preventing indiscriminate borrowing and wasteful expenditure." Control of the Salt Gabelle was asked for to give permanent security easily assignable in case of trouble. In former days the security given for various loans was not assignable but the conditions then were different. There was a dynasty which had responsibility and was believed to be a permanency. The present Government has little responsibility and in regard to its permanency opinions differ. In the old days the credit of the Chinese Government was built upon the foreign-controlled Maritime Customs and was very high. During the Revolution it was noted with surprise in some quarters that China's credit judging by the price of her Bonds had not suffered. This was simply because the Banks allowed no coupon to go by default and the Maritime Customs was the base of China's credit, and, being under foreign control, the revenues could not be seized either by the Revolutionaries or the Imperialists. Had the Maritime Customs been under Chinese control the southerners would have grabbed all the revenues in the portion of the country under their jurisdiction, while the Imperialists would have seized those in the north. The result would have been an indefinite protraction of the war, with a continuance of bloodshed and disorder, and the eventual bankruptcy of the country. That they now keep in view and in order to safeguard investors in any new loan they decided that the security must be such that no second revolution could cause it seriously to depreciate. Foreign control of the Salt Gabelle was, they deemed, the only method by which the interests of the bond-holders could be thus protected. A point that must not be forgotten is that the Six Groups were prepared to issue a loan within the present year up to £20,000,000.

MR. HSIUNG HSI-LING

EX-MINISTER OF FINANCE WHO NEGOTIATED THE INDEPENDENT LOAN AGREEMENTS

The claim is made that if any Group is altruistic it is the Six Groups. Their prestige in the money markets of the world would not permit them to issue any bad bonds. The Groups wish to make China strong and substantial; they do not want her to be in tutelage. The Banks in the Group are looking for returns in the shape of the business from a reorganized and prosperous China, not profits from loans. Their desire is to build up prosperity so that they may have permanent business. The Groups proposed to issue Bonds after the first issue at a fixed commission and the ultimate price to the Chinese Government would be regulated by the price of the Bonds and not by the commission. The Groups were confident that on these lines, with a contract for five years, they could handle the Bonds to the benefit of the Chinese Government. They would have a certain confidential status; they would be able to get better rates for the Government while the Groups' profit would remain the same. If the Chinese Government established an issue a point or two higher by utilising the Six Groups, which had the market, as an agency, they would build their credit up and at the end of the contract they could continue or discontinue the Groups' services as they pleased. But their credit would be good by that time. There would be no monopoly. It was merely a monopoly of the channel. If, for example, the United States were to issue Bonds in Europe they would have to go through a channel. The Groups would be the most advantageous channel for China.

With reference to supervision China declares that it is a blow at her pride. In reality supervision would be for the lasting benefit of China. She should stoop (if she so regards it) to conquer. In the French Revolution the Jews went to the Commune with financial aid and in the end the Commune succeeded, though it had to place itself in the hands of the lenders. There is much talk about the Egyptization of China. The trouble with Egypt was that indiscriminate loans had been made with various people, and eventually they could not be repaid. When the time came to collect the interest that was not forthcoming there were no Courts to which the creditors could go, and they had to appeal to their Governments and bring in diplomatic intervention. The then policy in Egypt and that which China wishes to adopt are parallel, and constitute financial suicide. Looked at from a broad viewpoint, the community of interests created by the establishment of the Six Groups would have reacted upon the six Governments' policy in welding them into a united sympathetic attitude towards China. If China breaks that common tie it will probably mean a revulsion to the conditions in 1898, when everyone was taking all that was to be got.

OTHER ASPECTS

The foregoing illustrates the views of the supporters of the Crisp Loan and those who oppose it, on the broader grounds. There are other aspects to be considered before giving attention to the actual effect of the loan on China's credit and the financial position in which China stands to-day. The supporters of the Crisp Loan claim that China has now asserted her independence of the Six Groups and that consequently her credit is better than before. The opponents of the Crisp Loan are more explicit. They point out that the price of bonds to China—89—is an extremely low one. The Hukuang Loan was fixed at 95, and was issued to the public at 100 1/2, whilst the Crisp Loan—or forty per cent. of it—went at 95, and it is declared that the 60 per cent. taken up by the underwriters was given at a half per cent. discount. There was no underwriting at all with the Hukuang Loan, which was over-subscribed tremendously, and the subscription lists closed in one and a half hours. There is reason to believe that the Six Groups, if they had got the terms they asked, could have sold the proposed bonds at par. China would have got at least 95 instead of 89.

She would, too, have established a high price for Bonds, and on the commission principle would have got the five points more on successive loans. The Crisp Loan, it is remarked, is the first Chinese issue that has not been fully subscribed. Usually the subscription list is closed in an hour and a half, with large over-subscriptions. The result of the comparative failure of the Crisp Loan will make bankers doubtful in regard to Chinese securities; they will not give so much accommodation.

The point that is most insisted upon is that China has pledged all her available, or most valuable, security as security for loans which are admitted to be only temporary stop-gaps to pay soldiers, etc. The money will soon disappear, and in a short period China will be as badly off as before. The securities will have been parted with for a little temporary relief instead of having been used to make a permanent arrangement to utilise them for reconstruction and building up revenues to assist them in future dealings. That the Crisp Loan is inadequate, even for the immediate requirements of China, is shown by the Chinese Minister of Finance. On October 7 he sent a circular telegram to the provinces in which he stated that from the Crisp Loan the sum of $26,000,000 would be available this year. This represented the assets of the Government. The liabilities were:

Payment of Troops	$20,000,000
Payment for Cruisers	10 000,000
General Expenses (Ministry of Finance)	5,000,000
Imperial Pensions	3,200,000
Various Advances contracted by Peking and Nanking Governments	10,000,000
Indemnity	33,000,000
	$81,200,000

This shows a deficit of $55,200,000, after receiving the proceeds of the Crisp Loan, but the circular telegram states that these amounts are, if anything, underestimated, and the deficit is not expected to be less than $60,000,000, which represents liabilities maturing before December 31. The telegram makes an appeal to the provinces to come forward and pay off these liabilities for the Central Government; points out that the Provinces cannot expect any advances from the Central Government, and reminds the Provinces that the Customs revenues are all pledged.

According to an authority, not connected with the Government, liabilities of £5,000,000 will mature up to December 31, and on June 30, 1913, another £5,000,000 will be due. It is extremely doubtful whether the second moiety of the £10,000,000 of the Crisp Loan can be floated, consequently China will have liabilities of £10,000,000 to face, with but four million and a half wherewith to meet it. To be strictly accurate she may have £4,000,000, as she has already spent half a million out of this loan, and it has to be borne in mind that the cost of carrying on the Government all this time has to be met.

The Salt Gabelle

The security for the Crisp Loan was the unpledged revenue of the Salt Gabelle, and on no point does there seem to be a wider difference of opinion than in connection with its adequacy and availability as security. In the prospectus of the Crisp Loan it was stated that the Chinese Government guaranteed the unpledged surplus of the salt revenue to be Tls. 23,000,000 per year. As a fact the Boxer Indemnity calls for some £3,000,000 per year. The Customs revenue will show a surplus in favor of the Indemnity of about Tls. 10,000,000, at December 31, and the rest of the Indemnity will fall upon the salt revenue. That is to say Tls. 15,000,000 will be charged against the revenue from salt. According to the Government there is still a surplus of Tls. 23,000,000, so they anticipate the total revenue from salt to amount to Tls. 38,000,000. The cost of collection is Tls. 7,000,000 which makes the gross value of the Gabelle Tls. 45,000,000—which is in accordance with the estimate for 1911-12 that was laid before the National Council by Duke Tsai Tze, who was then Minister for Finance. As a matter of fact Duke Tsai made the total Tls. 47,000,000. It is gravely questioned whether these figures are accurate. The estimate includes all the salt taxes, the likin, and super-taxes that have been imposed from time to time during the past ten years. The various super-taxes considerably increased the Salt Gabelle revenue. They were imposed by the various Provinces with the authority of the Central Government to assist the provinces in meeting the heavy claims upon them in connection with the indemnity services. The various Provinces were held responsible for certain portions of the Indemnity, and each Province paid a different amount.

Mr. Chou Hsüeh-hsi
PRESENT MINISTER OF FINANCE

In stating that the free surplus from the salt revenue would be Tls. 23,000,000 the framers of the prospectus of the Crisp Loan assumed that the collection would be what it was before the Revolution, and that the Central Government was in control of the revenues. As a matter of fact the collection is not the same as before the Revolution, and it is not under the control of the Central Government. Where it is now collected it is utilised by the Provinces. Mr. Chou Hsueh-hsi, the Minister of Finance, has stated that the actual contributions to the Central Government for July, August and September from the Provinces had amounted to Tls. 1,600,000, a little more than Tls. 550,000 a month—and that represented, not revenue, but subscriptions to the Patriotic Bonds. The actual receipts of the Imperial Government from the Salt Gabelle before the Revolution amounted to Tls. 20,000,000 per year, showing that the Provinces had then slowed up if the net collection was Tls. 40,000,000. The gross collection was Tls. 47,000,000, the cost of collection Tls. 7,000,000, and the amount received by the Central Government, according to the Finance Minister was Tls. 20,000,000. Now the Government is receiving nothing. The prospectus consequently can scarcely escape the reproach of being misleading. How misleading the whole proceeding has actually been will be realised by the bond-holders of the Crisp Loan when they fully appreciate the significance of the action taken by the Diplomatic Body in Peking when the Minister of Finance recently ordered the payment of the revenue of the Tientsin Salt Gabelle to the Chartered Bank for the service of the Crisp Loan. On the grounds that China may not alienate any portion of the Salt Gabelle until the Boxer Indemnity and other claims are liquidated the Italian Minister protested immediately to the Government against the action of the Minister of Finance, and in addition the Sextuple Banking Group took occasion by the hand to remind the Government that the advances it had made to the amount of some £1,800,000 were a prior claim upon the Salt Gabelle. On October 23 the Diplomatic Body appointed the Italian, French and Austrian Ministers to draw up a formal protest for presentation to the Government. This will place the Government in a quandary which its own lack of foresight has provided for it, and may likewise seriously affect the bond-holders of the Crisp Loan who have been so incautious as to flout the advice of the British Government as to the inadvisability of investing money in Chinese Bonds other than those floated on security tangible and properly controlled.

What all this resolves itself into is that the actual security for the Crisp Loan is the good faith of the Chinese Government, a security that the Chinese people have resolutely refused to accept as sufficient to warrant the employment of their money in the purchase of Chinese Government Bonds! That the Salt Gabelle could be made under proper supervision a sufficient security for a much larger sum than several times £10,000,000 is undoubted. Hsiung Hsi-ling, whilom Minister of Finance, estimated that the gross revenue could be raised to $109,000,000, with a tax of $2 per picul. He arrived at this result by estimating the population of China at 420,000,000 and assuming the consumption per head annually at 13 catties. This estimate of the population is not based upon reliable figures, but it is thought that a reorganization of the Salt Gabelle might produce a gross return of Tls. 73,000,000. Unless, however, the Gabelle were under foreign control there would be no guarantee that the extra revenue would find its way into the coffers of the Central Government. The probabilities are all the other way. The Provinces, having become accustomed to use this revenue for local purposes, are hardly likely to hand it over without protest to Peking, though the public can expect very shortly, an increase in the price of salt as a result of the efforts of the Government to overcome its financial difficulties on the lines suggested by Mr. Hsiung. It must be borne in mind that there are two small provincial loans for which the salt revenue is security, the Hupeh Silver Loan of Tls. 2,000,000 and the Liang Kiang Silver Loan of Tls. 3,000,000. There is evidence, too, that the Provinces look upon their salt revenues as their own, and it will probably take the Central Government some considerable time to convince them to the contrary. The sole authority for the statement made by the Chinese Government, and repeated in the prospectus of the Crisp Loan, that there was Tls. 23,000,000 free revenue was the Budget published last year. Even assuming that the Budget was accurate conditions have completely changed and there is no absolute certainty in regard to the amount that the Salt Gabelle will return to the Central Government. It is now charged with the service of seven loans of importance and some smaller provincial loans, and is also the security for the advances made by the Six Groups. Excluding the latter, it is estimated that the salt revenue is mortgaged to the extent of about Tls. 27,500,000, which, accepting the estimated revenue of Tls. 47,000,000 as accurate, only leaves Tls. 19,500,000 for the service of the Crisp Loan instead of Tls. 23,000,000. One possibility should not be lost sight of. The default of payments on the Indemnity by China might cause the creditor nations to take over the administration of the Salt Gabelle, in which case the claims of the bondholders of the Crisp Loan could not be admitted, since Sir John Jordan, the British Minister at Peking, has officially rejected the notification by the Waichiaopu of the conclusion of the loan on the ground that the transaction does not correspond with the declaration of the six Ministers on July 9, relative to the conditions on which they will approve loans to China.

THE EFFECT ON CHINA'S CREDIT

Nothing can be more certain than that China's credit has been most adversely affected by the Crisp Loan. The Bonds that are secured upon the Customs revenue and upon the North China Railways will not be affected because they are based upon securities that are admittedly gilt-edged. But this cannot be taken to indicate that China's credit has not suffered. She must soon come upon the market again. Her last tangible security has been pledged for a loan that is confessedly to be employed in staving off immediate bankruptcy. For the money that would have to be borrowed to promote industries and increase production, and thus build up the revenues, she has no security left to offer. Her requirements in this direction are enormous. Had she accepted the friendly assistance of the International Group, and consequently gained the goodwill of the six Governments, the Salt Gabelle would have been reorganized and would have become ample security for future loans. In its present state it provides doubtful fany security whatever for the stop-gap Crisp Loan, which will only postpone the evil day when China has to admit officially that she cannot meet her obligations. Only extraordinary good fortune in the shape of speedy returns from favorable crops and a willingness on the part of the populace to pay their taxes (which in some province they now refuse to do), can save her from that fate.

The issue of the loan at 89 in itself struck a heavy blow at China's credit. Had the Six Banking Groups handled the loan it would have been secured by the Government at 95 at least, and beyond question would have been snapped up by the investing public as it would have had behind it, not only the good faith and credit of China, but practically speaking the good faith and credit of the six Powers. The fact that China in her 1912 loan only received 89 and tied herself up in an agreement to that figure has been now bruited all round the financial world, and any loan that is placed in the future must be affected. The Chinese Government may think that because the Bonds secured on the Customs do not depreciate that her credit is as good as ever. A little thought should show that those Bonds are high simply because the Customs is the security and the Customs is not in China's hands, but is administered apart from them. The security is good because trade goes on, the duties are collected and the revenue banked whether there is a political crisis, a revolution, or not. If the Salt Gabelle had been in a similar condition China would never have had to accept a loan secured on its revenue at 89. It is not the Bonds secured on the Customs that denote Republican China's credit, but the 1912 Bonds which were sold by China for 89, were issued with extreme difficulty at 95, and dropped immediately to 94½, with a 1% drop by October 2, though they recovered a little. The fact that the Continental Bourses were closed to the loan foredoomed it to failure. There is no disguising the fact that to regain a fictitious "independence" China has pawned her last asset that might have been so developed that it would have helped her over the period of national reorganization, and has abated her credit. As the official estimate (which we append) for the months of October, November and December shows, her receipts are estimated at $27,195,986 and her expenditure at $70,095,688 showing a deficit of $42,899,701.

At the present moment China is trying by hook or by crook to raise more money. She is said to have closed a contract with the Belgian Syndicate for £10,000,000, ostensibly to be used for building a railway from Haichow to Lanchoufu. It is, however, rumoured that China's real intention is to obtain money for current expenses, which, if true, entirely bears out the judgment of those who warned her against contracting the Crisp Loan on the ground that it would add to China's difficulties instead of relieving them. The sum of $1,000,000 is said to have been paid to China as "bargain money," which seems to support the rumour that the loan is not really for railway constrnction. If China thinks that she can raise money for administrative purposes by pretending that the funds are required for railway construction, her association with the Jackson International Syndicate must have given her a poor opinion of the financial acumen of the foreigner.

To sum up. The floating of the Crisp Loan at 95, China receiving 89, has lowered China's credit certainly to 95 and probably to 90. Moreover she has parted with her last tangible productive asset and has rendered almost impossible the raising of further funds from the foreign money market. She will have in the last three months of this year £4,000,000 wherewith to meet liabilities of at least £5,000,000. She has committed herself to certain statements about the free revenue from the Salt Gabelle which are likely to prove erroneous. Moreover she has flaunted the advice of the Powers whose friendship is most likely to be valuable to her. What has she gained? "Financial independence," answer the supporters of the Crisp Loan. But has she? The Crisp Agreement, as will be seen by a glance at Article 14, in itself ties China's hands. She has only added another link to the chain. Like Egypt, China seems to have resolved upon financial suicide, and it is not a pleasant reflection for Britons that British financiers have supplied her with the means of self-destruction.

THE CRISP LOAN DISBURSEMENTS

From the *China Republican* we take the following statement showing the

Mr. Liang Shih-yi
Adviser to the President

expenditure of the first instalment of £500,000 of the Crisp Loan, received through the Chartered Bank:

Interest on the Belgian Loan to be paid on Oct. 6, £6,250.

The balance of £493,750 was, after deducting loss of exchange, converted into P. Taels 3,325,816.707

Following are the disbursements from this sum, as published by the Ministry of Finance:—

Ministry of War for Sept.	Tls. 800,000.00
Repayment of loan borrowed through Mr. Wong Kuk-min for the payment of troops for the month of August	,, 510,898.50
Salaries of the Military Advisory Office (arrears for February)	,, 5,000.00
Left Guard of the Wu Wei Regiment	,, 79,297.40
Imperial Bodyguard	,, 70,000.00
Peking Guards for Sept.	,, 133,397.243
Interest on loan borrowed from Po-Sheng Bank	,, 23,741.00
The Altai Army	,, 30,000.00
Bannerman Allowances for the 9th moon	,, 312,029.149
Total Peiyang	Tls. 1,964,363.292

Tsung Yi-yuan Building	$ 30,000.00
Ministry of Justice for Sept.	20,000.00
Bureau of Merits	34,000.00
Ministry of Navy	100,000.00
Interest on loan from Po-Sheng Bank	50,400.00
Imperial Pension	250,000.00
Peking Guards, arrears of payment for Aug.	69,444.44
Peking Guards, arrears of payment for Aug.	6,044.44
Ministry of Education	8,000.00
Ministry of Home Affairs	50,000.00
Tsen Tsun-hsun for Fukien	200,000.00
Nanking troops	500,000.00
Tutuh Pa Wen-wei's troops	180,000.00
General Hsu of Yangchow	150,000.00
The 8th regiment	70,000.00
The Ministry of Navy for expenses of the warships, etc	100,000.00
The Law Bureau	5,000.00
The Government Printing Office	2,000.00
The Shanghai Arsenal	50,000.00
Ministry of Agriculture	15,000.00
Total	$1,891,688.88

This is equivalent to P. Tls. 1,362,015.994. There is a deficit balance of Tls. 562.579, which was paid out from the accounts of the Ministry of Finance.

The Estimated Revenue of the Central Government for October, November, and December

Appended are the official estimates of the Central Government for the months of October, November, and December, and the original estimates for the year 1912:

Total Revenue Receipts	$27,195,986.985
Expenditure	70,005,688.158
Deficit	42,809,701.173

	Ordinary Expenditure.	*Extraordinary Expenditure.*
Waichiaopu	$726.546.	$155.795.
Board of Interior.	1,158,994.93.	305,114.155.
,, ,, Finance.	32,853,383.787.	2,695,187.7
,, ,, Education.	619,250.56.	252,544.
,, ,, War.	18,738,602.225.	578,985.46
,, ,, Navy.	894,945.6	76,890.
,, ,, Justice.	299,520.6	76,398.
,, ,, Agriculture, and Forestry.	179,459.2	76,395.
,, ,, Industry and Commerce.	99,797.28	35,398.44
,, ,, Communication and Posts.	298,681.93	208,200.

Original Estimates.

Estimated revenue of the Central Government for 1912, based upon the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze.

I.—The Ordinary Revenue.

Land Tax	$47,847,070

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the total revenue for the Empire amounts to $76,545,320. It is decided from the above estimate that ten-sixteenths of the above sum shall be appropriated for the use of the Central Government, amounting to $47,847,070: that six-sixteenths amounting to $28,698,250 shall be appropriated for local expenditures.)

Salt Tax	$71,292,812

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the ordinary salt revenue amounts to $71,279,902, the especial fees amount to $12,910, giving a total of $71,292,812 from the salt industry.)

Customs	$67,120,582
Likin	36,584,500
Registration Fees of Title Deeds	15,127,459
Tobacco and Wine Taxes	9,040,405

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the ordinary tobacco and wine revenue amounts to $6,288,610, but the special fees amounting to $2,751,840, have been abolished. The sum of the special fees and the ordinary revenue of tobacco and wine taxes amounts to $9,040,405.)

Mine Tax	$ 1,168,872
Stamp Taxes	93,187
Oil and Sugar Taxes	862,468
Government Properties	20,710,572
Miscellaneous Revenues	24,547,641

II.—Extraordinary Revenue.

Land Tax	$ 1,556,940

(According to the estimate of the late Manchu Government for the Chinese calendar year of Jen Tsze, the extraodinary revenue for the Empire amounts to $2,491,112. It is decided from the above estimate that ten-sixteenths, amounting to $1,506,940, shall be appropriated for the use of the Central Government; that six-sixteenths, amounting to $934,172, shall be appropriated for the local expenditures.)

Salt Tax	$ 83,326
No Customs	
No Likin	
Registration Fees of Title Deeds	46,618

Mine Tax	39,502
Opium Taxes	145,704
Special Taxes	887,718
Miscellaneous Revenue	7,201,827
Government Properties	205,474
The Total of the Ordinary Revenue	295,708,112
The Total of the Extraordinary Revenue	10,167,112
The Grand Total	$305,875,224

FOR THE LOCAL EXPENDITURES

Ordinary Revenue.

Land Tax	$28,698,250
Taxes of Pawn Shops	1,125,617
Broker's Fees	957,128
Taxes of Domestic Animals	1,387,917
Business Taxes	238,350
Miscellaneous Revenues	5,709,672
Taxes of Grains	2,911,579
Miscellaneous Fees	2,379,427

EXTRAORDINARY REVENUE

Land Taxes	$934,172
Opium Taxes	523,167
Miscellaneous fees	119,524
The Total of the Ordinary Revenue	43,407,895
The Total of the Extraordinary Revenue	1,576,863
Grand Total	$44,984,758

CHINESE GOVERNMENT 5 PER CENT. GOLD LOAN OF 1912

FULL TEXT OF AGREEMENT

We present herewith the full text of the final agreement between the Chinese Government and C. Birch Crisp and Company for the provision of a loan of £10,000,000, half of which (£5,000,000) was offered to the public in China and London on the 27th of September. The published Prospectus shows that the underwriting syndicate is composed of the following British Banks:—

The Chartered Bank of India, Australia and China, London.
Capital and Counties Bank, Limited, London.
London and Southwestern Bank, Limited, London.
Lloyd's Bank Limited, London.

Agreement made this thirtieth day of August 1912 between His Excellency Lew Yuk Lin the Chinese Minister to the Court of St. James in London duly authorized and acting for and on behalf of the Republic of China (hereinafter called the Chinese Government) of the one part and C. Birch Crisp & Company of London (hereinafter called the Financial Group) of the other part.

Whereas the Chinese Government is desirous of contracting a Gold Loan of Ten Million Pounds Sterling (£10,000,000) and

Whereas the preliminary agreement made between the Chinese Government and the Jackson International Financial Syndicate providing for the negotiation of this final agreement for the loan was duly executed on the twelfth day of July 1912 at Peking.

Whereas the said Jackson International Financial Syndicate have with the consent of the Chinese Government transferred their rights under the said preliminary agreement to the Financial Group it is agreed as follows:

ARTICLE I.

The Chinese Government authorizes the Financial Group to issue a 5 per cent. Gold Loan for an amount of Ten Million Pounds Sterling. The Loan shall be of the date on which the Bonds are issued to the public and shall be called "The Chinese Government 5 per cent Gold Loan of 1912."

ARTICLE II.

The Loan is designed to provide capital for the repayment of existing loans and for the reorganization of the Government and for productive works.

ARTICLE III.

The Loan shall constitute a direct liability and obligation of the Chinese Government which hereby pledges its good faith and credit for the punctual payment of the principal and interest of the Loan and/or the performance of all the undertakings on its part herein assumed.

ARTICLE IV.

1.—The payments of interest and the repayments of the principal of the Loan and all other amounts required for or incident to the service of the Loan shall be and hereby are constituted a first charge on the surplus revenues of the Salt Gabelle (Salt Tax) the total annual revenue of which amounts to forty-seven millions five hundred and ten thousand Kuping taels of which Twenty four millions per annum are already hypothecated. The remaining Salt Revenue now pledged to the necessary annual amount amounts to twenty-three million five hundred and ten thousand Kuping taels per annum.

2.—The above surplus revenue is hereby declared to be free from all liens charges or mortgages.

3.—Should the above mentioned revenue be at any time insufficient to meet the payments of interest and repayments of principal on due dates the Chinese Government will then from other sources supply the amount required to meet such payments.

4.—So long as the principal and interest of this loan are regularly paid there shall be no interference with the revenue herein pledged but if the principal and/or interest be in default at due date then in a reasonable period of grace the revenue above pledged or such part thereof as may be sufficient to provide and pay the amounts stated shall forthwith be transferred to and shall be administered by the Chinese Maritime Customs for the account and in the interest of the bondholders of this Loan.

5.—So long as this Loan shall remained unredeemed it shall have priority both as regards principal and interest by way of a lien or charge upon the above revenue for all future loans or mortgages which may be charged on the aforesaid revenue. No loan mortgage or other charge shall be raised or created which shall take precedence of or be on equality with this loan or which shall in any manner lessen or impair its security charged upon the aforesaid revenue and any future loan charge or mortgage charged on the said revenue shall be made subject to this loan and it shall be so expressed in every agreement for every such future loan charge or mortgage.

6.—In the event of the Chinese Government during the currency of the Loan entering upon definite arrangements for the revisions of the Customs tariff accompanied by stipulations for the decrease or abolition of likin it is hereby agreed on the one hand that such revision shall not be barred by the fact that this Loan is secured by the above named revenue and on the other hand that the revenue required to provide the security of this loan shall neither be abolished nor decreased except by previous agreement with the Financial Group and then only in so far as an equivalent security satisfactory to the Financial Group as substitute therefor in the shape of a first lien or charge upon other revenue consequent upon such revision.

ARTICLE V.

1.—The Financial Group are authorized to issue to the subscribers of the Loan Gold Bonds for the total amount of the Loan for such amounts as shall be determined by the Financial Group. The form and language of the Bonds shall be settled by the Financial Group in consultation with the Chinese Minister in London as the representative of the Chinese Government.

2.—The Bonds shall be printed and/or engraved and shall bear the fac-simile of the signature of the President or Minister of Finance and of his seal of office in order to dispense with the necessity of his signing them all in person. The Chinese Minister in London shall also previous to the issue of the Bonds put his seal upon each Bond with the fac-simile of his signature.

3.—The representative of the Financial Group in London shall countersign the Bonds as agents for the issue of the Loan.

ARTICLE VI.

1.—All details necessary for the prospectus of the Loan and connected with the payment of interest and repayment of Principal of the Loan and with the withdrawing of Bonds for redemption not herein explicitly provided for shall be left to the arrangement of the Financial Group in consultation with the Chinese Minister in London.

2.—Subject to the dates of payment for the Loan hereinafter stated the Loan may be issued in one or more instalments fixed by the Financial Group who are hereby authorized to issue the Prospectus or Prospectuses of the Loan at any time after the signature of this Agreement which is the proof that the issue and sale of the Bonds are duly authorized by and binding upon the Chinese Government and the Chinese Government will instruct the Chinese Minister in London to co-operate with the Financial Group in any matters requiring conjoint action and to sign the Prospectus or Prospectuses of the Loan and to provide any requisite documents for obtaining an official quotation of the scrip and Bonds in London and elsewhere.

ARTICLE VII.

1.—The price of the Bonds to the Chinese Government shall be 89 per cent. of their nominal value. Subscriptions may be invited by the Financial Group in China London or elsewhere preference being given to the application of the Chinese Government providing such application be made to the Financial Group not less than four days before the issue of the Prospectus to the public. Seven days' notice of the issue of the Prospectus will be given by the Financial Group to the Minister of Finance.

2.—The principal sum of Ten Million Pounds nominal shall be paid to the Chinese Government as follows:

£500,000 nominal on or before the 30th day of September 1912
£1,500,000 nominal on or before the 30th day of October 1912
£1,000,000 nominal on or before the 30th day of November 1912
£2,000,000 nominal on or before the 15th day of February 1913
and the balance of £5,000,000 nominal on or before the 30th day of September 1913.

ARTICLE VIII.

1.—The net proceeds of the Loan shall be placed to the credit of an account to be designated "The Chinese Government 1912 Gold Loan Account" in such Banks as shall from time to time be designated by the Financial Group and the sums so credited shall be held by the said Banks subject to the order of the said Minister of Finance.

2.—The Banks shall pay interest at the rate of three per cent. per annum upon the funds held by them except upon funds temporarily held by them in China where the interest shall be at the Banks' rates in Shanghai for current accounts.

3.—Orders for transfer of funds held by the said designated Banks shall be handed to the said Bank or Banks concerned not less than three days before such transfers are to be made. The expenses of transfer shall be borne by the Chinese Government.

ARTICLE IX.

1.—The rate of interest for the Loan shall be five per cent. (5 %) gold per annum on the nominal principal and shall be paid to the Bondholders half yearly as calculated from the date on which the Loan is issued to the public.

2.—The term of this Loan and of the Bonds evidencing the same shall be forty years from the date of issue of the Loan to the public. Repayment of principal shall commence with the eleventh year after the date of the Loan and shall be made by yearly amortisation in half yearly payments according to the amounts specified in the schedule to be attached to this agreement.

3.—The Minister of Finance shall twelve days before their due dates hand to the Bank or Banks designated from time to time by the Financial Group the funds sufficient to meet such half yearly payment of principal and/or interest in gold in London or elsewhere as may be required.

4.—The rate of exchange for such transactions shall be settled simultaneously with the Banks aforementioned by the Minister of Finance either at the market rate of the date on which such remittances are to be made or at the option of the said Minister of Finance on any date or dates within six months previous to any due date for the payment of interest or the repayment of the principal.

5.—In reimbursement of expenses connected with the payment of interest and the repayment of principal of this Loan the said designated Banks shall receive a commission of one-quarter of one per cent on the annual Loan service.

ARTICLE X.

If at any time after the lapse of fifteen years from the date of the Loan the Government should desire to redeem the whole outstanding amount of the Loan or any part of it not yet due for repayment in accordance with the schedule of repayment to be hereto attached it may do so up to the end of the twenty-fifth year by payment of a premium of two and a half per cent. on the face value of the Bonds (that is to say by payment of £102 10s for each £100 Bond) and after the lapse of twenty-five years without premium but in each and every case of such extra redemption the Government will give six months' previous notice in writing to the Banks and such redemption shall be effected by additional drawings of Bonds to take place on the date of an ordinary drawing as provided in the Prospectus of the Loan.

ARTICLE XI.

In the event of any Bond or Bonds issued for this Loan being lost stolen or destroyed the Financial Group and/or the said designated Bank or Banks concerned may notify the said Minister of Finance and/or the Chinese Minister in the country wherein the said Bond or Bonds may have been lost as the case may be who shall authorise the Financial Group and/or the said designated Bank or Banks concerned to insert an advertisement in the public newspapers stating that payment of such Bond or Bonds has been stopped and to take such other steps as may appear advisable or necessary according to the law or customs of the country concerned. Should any Bond or Bonds be destroyed or should such lost or stolen Bond or Bonds not be recovered in a lapse of time to be fixed by the said designated Bank or Banks the said Chinese Minister in London shall seal and execute a duplicate Bond or duplicate Bonds for a like amount and deliver the same to the Financial Group and/or the said designated Bank or Banks representing the owner or owners of such lost stolen or destroyed Bond or Bonds which Group and/or the said designated Bank or Banks shall pay all expenses in connection with such delivery and execution of such duplicate Bond or Bonds for the account of the owner or owners of such Bond or Bonds.

ARTICLE XII.

All Bonds and coupons and payments made and received in connection with the service of this Loan shall be exempt from all Chinese taxes and imposts of any and every description during the currency of this Loan.

ARTICLE XIII.

All expenses of the Financial Group in connection with the flotation and issue of this Loan such as underwriting commission and brokerage telegraph charges advertising postage engraving and printing of Prospectus and Bonds stamp and legal fees shall be borne by the Financial Group.

ARTICLE XIV.

The Chinese Government engage not to issue nor to authorise the issue of any other external loan until the whole of this Loan 1912 has been issued to the public on any more favorable terms than those contained in this agreement but if the Chinese Government should desire to obtain further foreign capital before this Loan is realised and the terms offered by the Financial Group are as favorable as those offered by others preference shall be given to the Financial Group.

ARTICLE XV.

If before the publication of the Prospectus for the issue of this Loan any political or financial crisis should occur affecting the money markets and the prices of Chinese Government securities in such manner or to such degree as in the opinion of the Financial Group will render impossible the successful flotation and issue of this Loan on the terms herein named the Financial Group shall be granted a period of six months from the date on which this agreement shall be signed within which to issue the Loan to the public. If on the expiration of this period the markets are still unfavorable then the Financial Group shall be entitled to ask the Chinese Government for reasonable extension of time within which to carry out this contract. If the Chinese Government should refuse to grant the extension of time requested this contract shall become null and void.

ARTICLE XVI.

The Financial Group may subject to all their obligations under this agreement transfer or delegate all or any of their rights powers and discretions thereunder to any British or other Company Directors or Agents with power of further transfer and sub-delegation such transfer sub-transfer delegation or sub-delegation to be subject to the approval of the Chinese Government.

ARTICLE XVII.

This Agreement is signed by the Chinese Minister in London as the representative of the Chinese Government and will be forthwith officially communicated to the Minister of Great Britain in Peking by the Wai Chiao-pu (Chinese Foreign Office) and by the Chinese Minister in London to the British Secretary of State for Foreign Affairs and a copy of each such formal notification and any reply thereto shall be communicated to the Financial Group.

Signed at London this the thirtieth day of August one thousand nine hundred and twelve.

(SIGNED) LEW YUK-LIN
G. BIRCH CRISP & CO.

WITNESSES:

J. MACLEAVY BROWN.
ERNEST RONEY.

A CAMPAIGN OF CALUMNY

The campaign of villification indulged in by the original promoters of the Crisp Loan to influence public opinion in China against the Foreign Governments and the Sextuple Group of Bankers reached a climax when their organ, the "National Review" of Shanghai, in a leading editorial appearing in its issue of September 14th, wilfully insulted the American Minister at Peking, characterizing the eminent and respected international jurist as a financial lawyer solely devoted to the interests of a powerful financial house. An unwarranted and undignified attack of this nature on a diplomat enjoying the high reputation of Mr. Calhoun is beneath the notice of honourable journalism, but when it is known that the newspaper publishing the libel enjoys the confidence and support of the Chinese Government, and that the owners of the "National Review" were interested in the promotion of the Crisp Loan and stood to gain through its successful flotation, its campaign of defamation against those supporting the Sextuple Group is an unpardonable offence against the ethics of journalism and good manners.

Perusal of British newspapers of the dates corresponding with the issuance of the Crisp Loan on the London market, also reveal a most astounding campaign of press misrepresentation, and appeals to national antipathies unparalleled in the history of yellow journalism since the days preceding the Spanish-American war in 1898. The entire campaign reeked with abuse of the British Government and the British Corporation that had successfully carried the brunt of the financial battles of the last two decades for the advancement of British prestige and trade in China.

The fact that the directorate of the Hongkong and Shanghai Banking Corporation included the names of four German gentlemen, heads of the largest German commercial firms in Hongkong and China, was used as the lever to work the British public into a frenzy of patriotic indignation against the policy of the Foreign Office in standing by its word of honour given to five other Governments. The German bogey was conjured up before the eyes of an overwrought public, and when the loan went on the market it was successfully absorbed on purely national grounds.

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Newspaper invective and misrepresentation directed against the British Government and the Six Power Group, by which the British public was blinded to the true facts of the position was solely responsible for what is jubilantly termed a triumph of British financial genius, and a victorious restoration of British prestige in China.

The original promoters of the Crisp Loan are the Jackson International Financial Syndicate, closely allied with a concern known as the China Conservation and Development Company, Limited, organized under the Companies Ordinances of Hongkong for the purpose of making loans and obtaining mining and other concessions. It is a curious coincidence that the names of the original incorporators of the above company coincide with the names of the part owner, managing editor, editor artist, translator, advertising solicitor, and a member of the family of the managing editor, or in other words, with the entire staff, of the "National Review," a part-Chinese-owned and British edited weekly newspaper published in Shanghai. In addition to the above list of incorporators appears the name of an American who with the part owner and managing editor of the "National Review" comprise the directorate of the concern. It is quite apparent that the China Conservation and Development Company is therefore under the control of the owner or owners of the "National Review," and the staff of the paper was taken in primarily to secure the necessary number of names for registration purposes. This reduces the company to the owners of the "National Review," one of whom is a high official of the Chinese Government intimately associated with the President and his advisers, and the other the British Managing Editor. Or, again, it narrows down to the man with the influence, the close friend and confidant of those high in office at Peking; or a last analysis would reveal that the China Conservation and Development Company, Limited, was simply a Chinese controlled concern in which enough foreign names had been admitted to disguise the real Chinese character of the organization.

From the fact that a high Chinese official is the central figure in a foreign corporation whose avowed purpose is to make loans to and obtain concessions from the Chinese Government and that this official was in Peking when the preliminaries of the loan were being negotiated, it is logical to deduce that it was through his undoubted influence that the preliminary contract for the £10,000,000 loan at 89 was secured for his associates.

It is claimed by the Sextuple Group that they stood ready to underwrite Chinese bonds at 95 on the security of the unattached surplus of the Salt Gabelle. But we find that China in her very natural desire to escape the conditions imposed by the Sextuple Group as to the auditing of expenditures and control of the Salt Tax entered into a contract with a Chinese controlled promotion company to give the Salt Gabelle revenues as security for a loan to be issued to the promoters at 89. The Chinese Government emphatically assured its Minister at London by cable, for the express benefit of the British public, that the unattached portion of the Salt Gabelle was more than ample for the service of the present loan, and in fact there would still be a surplus available for the security of future loans. The question naturally arises: If China was absolutely certain as to the amount of the surplus, why was she so anxious to sacrifice her credit and permit the loan to go to the promoters at 89 and to the public at 95, when she could have secured 95 from the Sextuple Group with a possible flotation to the public at par? Surely, if the unattached surplus of the Salt Gabelle is what China officially declares it to be, the negotiation of a loan at 89 on such excellent security must be viewed as the price China was willing to pay to escape the conditions of the Sextuple Group, or would indicate that the Chinese controlled promotion company was unduly favored by terms which the Chinese Government would never have granted to any other combination. The issuance of the Loan at this low figure, on such good security, would also explain the willingness of the British underwriters to undertake the business in defiance of the expressed wishes of the British Government. It would furthermore explain why the original promoters in China disregarded all the ethics of journalism and the instincts of patriotism in their vindictive campaign against the British Government and the Groups through the medium of their organ, the "National Review," published at Shanghai. The publicity campaign carried on by this newspaper against those opposing the Crisp Loan is the most prominent and questionable feature of what otherwise might be considered a legitimate effort on the part of the promoters to advance the interests of China and insure the success of the loan. Commercial journalism was probably never before so brazenly flaunted before the public.

In its zeal to line the pockets of the original promoters with their share of the promotion profits, the Editors so far forgot the allegiance and loyalty due their own country as to forge the weapons which the Chinese might employ in a boycott against British trade in China. The great fair-minded

British public, hypnotized by an appeal to their patriotism by the promoters at the London end, rose to the bait, and under the delusion that the loan would strengthen and restore British prestige in China took up forty per cent of the issue, while at this end the original Sino-British promoters of the loan were goading the Chinese into a frenzy of anti-British feeling through the medium of the "National Review" and nullifying the work of the London promoters. It is a sorry picture for Britons to contemplate.

China has, yet to learn that a newspaper campaign improperly directed may prove a curse rather than a blessing, and that "most modern wars may be ultimately traced to national antipathies which have been largely created by newspaper invectives and by the gross partiality of newspaper representations." China's side of the loan situation could have been set forth in a dignified and telling manner by proper publicists and obtained for her much needed sympathy and support.

With all the opportunities of the last year of charging officials with corruption, the foreign press has carefully avoided intentionally wounding the feelings or susceptibilities of Chinese officials, who, in other countries, would have been "muck raked" into political oblivion. If China is satisfied with the terms of the Crisp Loan at 89 when she could have secured 95 it is her own concern, and her friends can only hope that the sum so borrowed will be sufficient to tide her over until her internal revenues are reorganized and sufficient funds are available from the provinces to carry on the government without further recourse to a foreign loan for admistrative purposes. The only regret is that she should have employed a medium which has misused its power to create and foster ill-feeling on all sides.

The insult to the American Minister, coming from a paper claiming to receive the support of the Chinese Government, together with the rabid anti-British attacks, and the vindictive campaign against the Groups and those opposed to the loan, can only have one effect; and when the sober solid sense of the British public at home has again reasserted itself and it discovers how its well meant support has been negatived by the work of a group in China whose pockets were its first concern, a reaction will set in which is bound to have a serious effect on China's credit.

If the "National Review" has ceased to receive the support of the Chinese Foreign Office, an intimation to that effect from Mr. M. T. Liang, the Minister for Foreign Affairs, would only be a delicate and courteous action due to Mr. Calhoun and American residents in China, otherwise American opinion will associate the slur to its Minister as emanating from a semi-official organ of the Ministry of Foreign Affairs.

U. S. R'Y RECEIPTS & EXPENSES

As the month of July began a new fiscal year for American railways and also from all indications a period of reviving traffic, it is probable that the railway returns will be closely watched, especially during the months of the presidential campaign. But the uninitiated reader who tries from the newspaper reports of earnings and expenses to keep track of the business of the railways has a perplexing task, for in one and the same issue of a newspaper he not infrequently finds statements of earnings and expenses that may refer to different periods separated by weeks or months, or maybe a year or more.

The accounting departments of many of the principal railroad companies make up at the close of each week estimates of the receipts for that week and sometimes include estimates of the expenses. These are primarily for the information of the officers and directors of the companies, but are frequently sent to the newspapers. Thus appear estimates and cumulative estimates for the first, second, third and fourth weeks of each month and for the entire month. These are but estimates in gross, and as such serve as the earliest approximate indications of increase or decrease in the volume of traffic. They are widely regarded by business men as a barometer of the general business of the country. From these estimates various financial newspapers frequently compile tables showing approximately the earnings and expenses of a number of roads selected as representative.

As soon after the close of each month as practicable each railway company is obliged to send to the Interstate Commerce Commission a report of its total operating revenues during that month with separate specification of the receipts from freight, passengers, mail and express; of its total operating expenses with separate specification of those incurred for maintenance of way and structures, maintenance of track and equipment, for securing traffic, conducting transportation and in general; of the nett operating revenue; of revenue from outside operations; of taxes; and of operating income which is the amount remaining as available for rentals, interest on bonds, appropriations for betterments, and dividends.

The filing of these monthly reports with the Interstate Commerce Commission is usually not completed until about six weeks after the close of the month to which they refer. From these official reports the Bureau of Railway Economics, an organization maintained in Washington by the railways, compiles a summary of revenues and expenses for the month which is usually issued within a week after all of the reports have been filed. Most of the newspaper publications of earnings and expenses give the amounts for the different railways separately, the information thus presented being of especial interest to the investor who wants to know what each road is doing. The compilations of the Bureau of Railway Economics, however, are of the collective earnings and expenses of the Eastern, Southern and Western groups of railways, thus showing the ebb and flow of traffic for the three great sections of the country, each of which has its peculiar economic characteristics. These publications also contain comparisons of the earnings and expenses per mile of line, thus showing the actual trend of railway business, the indication of which is often confused in other compilations by the use of aggregates applying to the total mileage, which is continually increasing to a greater or less extent The earnings and expenses are thus also reduced to concrete and comprehensible units of measurement.

For example, in its summary of earnings and expenses for June 1912, the Bureau of Railway Economics shows that the nett revenue for the month increased about 48 cents for each day for each mile of line over the nett revenue of June 1911. It shows that during the fiscal year ending June 30, 1912, total operating revenues increased $83 per mile of line, leaving a decrease in nett revenue of $60 per mile of line. An increase of $48 in taxes and a decrease in nett revenue from outside operations resulted in a decrease in operating income of $112 per mile of line for the year. This is equivalent to a decrease in the operating income of the 215,000 miles of line to which these reports have applied on the average, of over $24,000,000.

The monthly report of the Interstate Commerce Commission issued usually about a month later than the summary of the Bureau of Railway Economics presents an abstract, company by company, of the monthly reports filed with it.

As soon after the close of the fiscal year as is practicable, and under penalty not later than September 30th, each railway company is required to make to the Interstate Commerce Commission an elaborate report of its transactions for the year. This includes a statement in great detail of receipts and expenditures, of mileage, of locomotives and cars, of the number of employees and their compensation, of the capitalization and capital issues, of statistics as to train miles, car miles, freight traffic movement, ton miles, passenger miles, taxes, and of profit and loss.

The statistics contained in these reports are of such great volume that their compilation requires several months, the annual report of statistics of the railways of the United States issued by the Interstate Commerce Commission not appearing as a rule until a year or more after the close of the year to which the statistics refer. It is a most valuable compendium placing before the student of railway transportation the most complete available information. The system of accounts prescribed for the railways by the Interstate Commerce Commission and the publicity in regard to their affairs which it has enforced have placed the railways in that position where far more is made public about their affairs than is known in regard to any other industry of the United States, or any of the state or municipal governments.

In addition to all the reports that have been enumerated each railway company makes an annual report to its stockholders to which many newspapers give more or less extended reference, and many if not all of the State Railroad Commissions require separate reports.

THE BUREAU OF RAILWAY ECONOMICS

In an address before the American Economic Association during the meeting of that body in Washington in December last President Taft congratulated the professional economists upon the increasing extent to which their services were being called into requisition by the Government for the investigation and analysis of intricate questions of public concern. He might have added that it is not alone the Government which has "turned the corner," as he expressed it, in calling for such expert service. A forward step in the same direction was taken by railway companies of the United States in establishing the Bureau of Railway Economics.

The need for such a bureau was first felt during the period of discussion which preceded the enactment of the Federal railway legislation of 1906 and 1910. Sometimes it happened that different analyses of serious matters were based upon varying *data* and led to inharmonious conclusions. Moreover, the railways were not always in the possession of the complete information necessary to enable them to refute widespread accusations that they knew to be unjust. Railway officers absorbed in the problems of immediate administration were without the time and the opportunity to study the broader questions of no less, and sometimes of greater, importance.

Its Origin.

In the spring of 1910 there was held a meeting of railroad presidents to discuss methods for bringing fulness of knowledge into their discussions of the broad questions of general concern, accuracy to their conclusions, and that force to their presentations which accuracy alone can give. It was recognized that to this end there must be a competent agency whose time and attention should be given entirely to the study of the more intricate subjects of general interest. It was recognized that the ultimate solution of the problems affecting the railways must be upon the basis of exact fact; therefore, that the exact facts underlying every question must be carefully ascertained and logically presented. At that meeting was appointed a general executive committee of six railroad presidents who established the Bureau of Railway Economics. The processes tending toward uniformity and standardization (referred to in other articles) which developed the American Railway Association charged with the study of matters pertaining to the physical and technical phases of railway operation, and which also developed the various associations of traffic, accounting and financial officers charged with the unification of procedure pertaining to their respective departments, thus led to the formation of an organization charged with the study of the relations of the railways to their environment—their economic relations.

A Source of Accurate Information.

The headquarters of the Bureau of Railway Economics were established in Washington that it might be facilitated in its scientific study of railway problems by ready access to the statistics and records of the Interstate Commerce Commission and of other departments and bureaux of the Federal Government. That its main function as a source of accurate and authentic information be not impaired, it was forbidden to engage in polemic and partisan discussion.

In furtherance of its purpose to become a recognized source of accurate and authentic information in regard to the railways the Bureau is building up a comprehensive library and has issued a catalogue of the existing body of railway economic literature. It works in harmony with, and sometimes in at least partial collaboration with, the Interstate Commerce Commission. The main point of distinction between the statistical departments of the two organizations is that while the compilations of the Interstate Commerce Commission principally serve the purposes of record and reference, those of the Bureau are designed to throw light upon various phases of the existing situation for the current information and guidance of its constituents.

Important Inquiries.

The Bureau makes special investigations, analyses, and compilations in response to specific requests of its subscribers. It publishes a monthly summary showing the collective trend of railway earnings and expenses, and from time to time it publishes the results of studies of general interest. Such, for example, is a comparison of the railway *status* of the United States with that of the principal countries of Europe. It has issued a bulletin comparing the facilities, serviceability, and utilization of the railways of the United States, the United Kingdom, France, and Germany; another comparing the railway wages and cost of living in these countries; and by the time this article appears has probably issued a further bulletin making a specific comparison of the freight rates in these countries. These general publications of the Bureau are sent not only to railway officers, but to the educational institutions throughout the United States, in which they are being used in increasing degree by teachers of economics, and to the railroad commissioners, by whom they are in constant demand. While the Bureau is not a publicity agency, the results of these studies are also made available to the newspaper Press for the information of the public in general.

From the London Times of June 28, 1912—"The American Railway Number."

BOOK REVIEW

History of Bridge Engineering

By Henry Grattan Tyrrell, Evanston, Ill.

The book is six by nine inchs in size, and contains 505 pages with 330 illustrations, a few of which are half tones. It is bound in cloth, sells for $4.00 per copy, and may be had at any book store.

It is written in semi-popular style, and while interesting chiefly to Engineers and Architects, will be appreciated also by others who care to follow the development of Architecture and Engineering through the centuries. It is divided into seventeen chapters, and covers the history of bridge building from the earliest times to the present day.

The first chapter is devoted to early Egyptian, Babylonian and Persian bridges dating back to 4000 B.C. and one bridge is described which is said to have been placed across the Euphrates river at Babylon 3200 B.C. The second chapter includes Roman bridges, covering the period from 700 B.C. to 400 A.D. and describes not only all the ancient bridges over the Tiber at Rome, but many others throughout the Empire, including some which are still standing and in use. Following this are two chapters on Mediæval and Renaissance bridges, which describe all the principal ones erected to the middle of the eighteenth century. In all of these early chapters, are illustrations of many bridges with features which are no longer needed, such as shrines and fortification towers, some of the designs being extremely picturesque. In many cases their towers and porticoes show a high degree of artistic design, and those at Avignon, Cahors, Florence and Prague have hardly been surpassed.

In addition to those for carrying roads and highways, the writer has included pontoon and aqueduct bridges, some of the latter which still remain dating back to the beginning of the Christian Era, such as the noted Pont du Gard at Nimes, France, which was built by the Romans during the reign of Emperor Augustus about 19 B.C.

The chapter on Modern Stone Bridges covers the period from 1750 to the present time and includes most of the notable ones of Europe which are now in use. These seven chapters including 120 pages, cover the history of bridges in stone.

Following these chapters are others on wood and cast iron arches, simple trusses, tubular and plate girder bridges, suspensions, cantilevers, metal arches, trestles, and last of al two chapters on concrete bridges, both plain and reinforced.

An interesting part of the book is that which describes the last quarter of the eighteenth century, when the first iron bridges appeared in England. For half a century the cast iron arch was used almost exclusively, and many beautiful examples appeared throughout the British Isles, the work of such men as Thomas Telford, and John Rennie. After the advent of railroads, bridge building assumed a new importance and structures were then made strong enough to carry heavy trains and locomotives, some of the most interesting ones being the work of George Stephenson who was Chief Engineer of one of the large railroad systems. The Britannia bridge in Wales and the old Victoria bridge at Montreal are the work of this eminent engineer and his son Robert Stephenson. The Author describes the elaborate experiments made by the Stephensons before starting work on their tubular bridges, and gives an account of their construction and completion, works which were then considered the triumphs and wonders of the age.

As cast iron arches were at first patterned after those in stone, so also were the first trusses in iron fasteined after the early ones in timber. Numerous illustrations are given showing the development of trusses from their first scientific beginning in 1847 to the present time.

The evolution of suspension bridges is then traced from the early ones of vines and twisted creepers, made by the Indians in Peru, and those in China, Japan, and India, to the completion of the great ones at Budapest, London and New York.

Cantilever bridges, which by some are considered new, are shown to have existed fifteen hundred years ago, though they were used only in very crude forms previous to the nineteenth century, when a span was projected to cross the Hudson River. Following this are accounts of all the great cantilevers, concluding with the completion of the Queensboro bridge at New York. This chapter contains many notable examples, including one which was proposed to cross the English Channel, and the great Quebec bridge now under construction.

The development of metal arch construction is traced from its beginning in 1776 down to the introduction of steel in the great spans crossing the Mississippi at St. Louis. Many illustrations are shown including several designs of unusual merit by American Engineers and Architects, which have not yet been executed. Many designs are described and illustrated including some of the beautiful ones over the Seine and the Rhine, and the long spans of 1,000 and 1,800 feet proposed for New York and Quebec.

Trestles, which were among the earliest known types, dating back to the days of Babylon, are described, and a number of modern types shown in both timber and metal. Some picturesque examples are illustrated including the old Portage viaduct and some of the very long ones, such as that crossing Great Salt Lake, Utah. George Stephenson's first metal trestle at West Auckland is shown, and also many others in Europe and America.

The last two chapters including fifty pages, describe concrete bridges, and show their rapid rise and use from their beginning in France about 1850.

The book is well printed on heavy paper, and should be valuable not only to students and lovers of history, but to engineers and designers, who will find in it many types and forms useful in the present day.

THE BRITISH ENGINEERS' ASSOCIATION

SOME ABRIDGED EXTRACTS FROM THE PARTICULARS ISSUED BY THIS IMPORTANT ASSOCIATION, WHOSE OBJECT IS THE PROMOTION OF BRITISH ENGINEERING INTERESTS IN CHINA

The formation of this association is evidence of an awakening to the enormous value of Far Eastern trade from the point of view of manufacturing engineers. That recognization has dawned slowly. We are confident that organized interest in the engineering possibilities of this part of the globe—as long as the ideal of Equal Opportunity and the Open Door is in view—cannot fail to have a general beneficial influence.

Readers of the FAR EASTERN REVIEW know that we have found it necessary to criticize the policy adopted in many instances in connection with railway construction in China of drawing up specifications for tenders in such a form that bids were necessarily restricted to favoured manufacturers of the nation represented by the engineer. Obviously if there is to be equal opportunity in China in this regard the standards of any particular country must not be adopted to the exclusion of others. The new Association will, no doubt recognise that fair play in this connection will be to the general advantage of the manufacturers of all countries. With the imminent enormous extension of railway construction in China it would be eminently desirable, as we have suggested before, that a temporary commission consisting of expert railway engineers, composed of one British, one American, one European and two of China's best railway men, should be appointed to draw up a Standard set of specifications for the rolling stock and equipment of the Chinese Government lines. Otherwise the system of discrimination will be continued and equal opportunity will disappear in connection with railway construction and equipment in China.

[Editor F. E. R.]

THE ORIGIN OF THE ASSOCIATION.

The British Engineers' Association is an organisation formed for promoting and protecting the interests of British manufacturing engineers abroad, and especially in China. To that country its immediate attention will be exclusively devoted.

After several preliminary meetings and discussions, twenty-two leading British engineering firms in September last decided to take the initiative in organising the Association. These firms found the funds necessary for the preliminary expenses, and from among their directors was formed a powerful Provisional Committee to carry on the work of the Association until its incorporation.

In the meantime a number of other well-known firms were elected, bringing the total number of members of the Association prior to incorporation up to sixty-one.

THE FIRST MEMBERS OF THE BRITISH ENGINEERS' ASSOCIATION.

W. H. Allen, Son and Co., Limited.
Avonside Engine Co., Limited.
Babcock and Wilcox, Limited.
British Aluminium Co., Limited.
British Insulated and Helsby Cables, Limited.
Peter Brotherhood, Limited.
Brown, Bayley's Steel Works, Limited.
Brush Electrical Engineering Co., Limited.
Callender's Cable and Construction Co., Limited.
Campbell Gas Engine Co., Limited.
Chloride Electrical Storage Co., Limited.
T. Cooke and Sons, Limited.
Craven Brothers, Limited.
Crossley Brothers, Limited.
Dick, Kerr and Co., Limited.
Fielding and Platt, Limited.
George Fletcher and Co., Limited.
Fraser and Chalmers, Limited.
Richard Garrett and Sons, Limited.
Glenfield and Kennedy, Limited.
W. T. Glover and Co., Limited.
E. Green and Son, Limited.
Hadfield's Steel Foundry Co., Limited.
J. and E. Hall, Limited.
Hardy Patent Pick Co., Limited.
Hayward-Tyler and Co., Limited.
Heenan and Froude, Limited.
Alfred Herbert, Limited.
Holden and Brooke, Limited.
Holman Brothers, Limited.
John Holroyd and Co., Limited.
Hughes and Lancaster, Limited.
Richard Johnston and Nephew, Limited.
H. R. Marsden, Limited.
Marshall, Sons and Co., Limited.
Mather and Platt, Limited.
Midland Railway Carriage and Wagon Co., Limited.
Miller and Co., Limited.
McKie and Baxter.
North British Locomotive Co., Limited.
Platt Brothers and Co., Limited.
Power Gas Corporation, Limited.
A. Ransome and Co., Limited.
Ransomes and Rapier, Limited.
Ransomes, Sims and Jefferies, Limited.
Robey and Co., Limited.
Rose, Downs and Thompson, Limited.
Royce, Limited.
Ruston, Proctor and Co., Limited.
Sandycroft Foundry Co., Limited.
Smith's Dock Co., Limited.
Stewarts and Lloyds, Limited.
Stothert and Pitt, Limited.
John I. Thornycroft and Co., Limited.
E. R. and F. Turner, Limited.
Vickers, Limited.
Vulcan Foundry, Limited.
Walker Brothers (Wigan), Limited.
J. Samuel White and Co., Limited.
Willans and Robinson, Limited.
Edward Wood and Co., Limited.

The Association was formally incorporated on April 26, 1912, under a licence from the Board of Trade. Consequently the liability of its members is strictly limited.

The objects for which the Association is established are:—

(1) To promote and protect the general interests of British manufacturing engineers.

(2) To consider all questions connected with such interests.

(3) To promote or oppose legislation and other measures affecting such interests.

(4) To collect and circulate statistics and other information affecting the general interests of British engineers and to diffuse amongst its members information on all matters affecting such interests.

(5) To support the British Government, bankers, financial corporations, shipping and railway companies, and any other organisations in promoting the general interests of British manufacturing engineers.

(6) To watch and report upon the methods and progress of foreign competitors in Asiatic and other markets and to suggest methods of counteracting foreign influences.

(7) To encourage the predominance of British technical instructors in Asiatic and other schools.

(8) To encourage technical colleges and schools in Great Britain to give facilities for Oriental and other students, and to establish or aid in the establishment of technical schools abroad for the furtherance of the objects of this Association.

(9) To aid by advice, co-operation, donations or otherwise any individual or concern who is able to promote the the objects of this Association.

(10) To invite members of the Association to give facilities for the introduction into their works for varying periods of Oriental and other engineers or engineering students.

(11) To endeavour to make the English language the recognised medium for the transaction of all engineering business.

THE CONSTITUTION OF THE ASSOCIATION.

The Articles of Association provide that this Association shall be governed by a Council consisting of a President, five Vice-Presidents, and not less than fifteen or more than thirty ordinary members of Council, elected annually from all the members of the Association.

The Council will elect from among its own members an Executive Committee for carrying on the active business of the Association.

A Commissioner or official representative of the Association, with such staff as he may require, will be located in China, and will carry on the business of the Association in that country, investigating actively all matters which are of interest to members of the Association, and forwarding at the earliest possible date such information to the office of the Association in London to be dealt with by the Council or Executive Committee and disseminated to all members.

The Commissioner in China will not communicate direct with any individual member, but individual members can apply for his advice on all specific matters through the London office.

In event of a member of the Association travelling in China he will be entitled to apply for advice and introductions to the Commissioner of the Association provided that he has notified the office in London of his intention to visit China and has obtained the necessary credentials.

It will be no part of the business of the Commissioner to endeavour to secure orders for any individual member, to discriminate between its members, or to favour one in preference to another.

The funds of the Association are derived from the subscriptions of members and entrance fees.

The whole of the income of the Association will be applied solely towards the promotion of the objects of the Association as set forth in the Memorandum and Articles.

THE QUALIFICATIONS FOR MEMBERSHIP.

Article 4 provides the following qualifications for membership:—

"Candidates for admission as members must be approved by the Council and must be bona-fide British manufacturing engineers or bona-fide British manufacturers of articles accessory to engineering plant other than those whose interests in foreign manufactures or otherwise might be antagonistic to the objects of the Association, and must be individuals or incorporated bodies. Any unincorporated body or firm falling within the above definition, if approved by the Council, may have the privilege of membership, meaning thereby the right to nominate anyone of its members to be a member of the Association as its representative. All corporate bodies must be represented by either a director or other responsible official properly accredited and not under twenty-one years of age. Such representative shall while thus accredited be entitled to all the rights and privileges belonging to membership. Any member ceasing to hold the necessary qualifications as defined above shall *ipso facto* cease to be a member of the Association and shall forfeit all rights of membership."

The fact of a firm possessing engineering or other works or being interested in such works in Great Britain does not *in itself* qualify that firm for membership, nor does the possession of engineering or other works outside Great Britain necessarily disqualify such firm from membership.

The essential point which will determine the qualification is whether in the opinion of the Council the applicant for membership has or has not foreign interests or connections which are detrimental to the interests of the Association.

The Value of China as a Market.

For some years, in spite of the powerful reactionary influences which existed in China until the revolution of last year, the progress in that country, and consequently the demand for engineering plant, has been growing with extreme rapidity.

Without going into details, it is well to state the fact that while Japan, usually cited as the most rapidly progressive country in the world, took thirty years to build 3,000 miles of railway, China has during the last twelve years built no less than 5,000 miles.

Naturally Chinese imports all round have increased very rapidly. During 1910, which was the last complete year of China under the old régime, they stood at £62,300,000, a rise of more than £12,000,000 over the previous year, and £15,000,000 more than Japan's imports for the same period, though in Japan, too, 1910 was a record.

Chinese engineering imports during 1910—that is to say, goods which would fall within the range of firms who are eligible for membership of this Association—were about £8,000,000. Of this total the British share may be put approximately at rather over 40 per cent.

China, however, is merely at the beginning of her career as an importer of machinery. With ten times the population of Japan, and perhaps a hundred times the natural resources of that country, and possessing a people in whom the business instinct is ingrained, there is no doubt that under the new régime, whatever form that may take, machinery requirements will undoubtedly expand, for the Chinese will be able for the first time to give free vent to their progressive tendencies. From this it is reasonable to suppose that China will become one of the greatest oversea markets for engineering plant.

A Comparison Between China and Japan.

China to-day, so far as her knowledge of engineering is concerned, is very much in the condition of Japan some thirty-five years ago, but the position of the British engineer in China is by no means as strong as it was in Japan at that period.

In dealing with Japan in the early days British engineers had an immense advantage over all their competitors. This was due to two causes: (1) Japan selected and paid for her own advisers and instructors and financed her own industrial enterprises. (2) She selected, as far as engineering was concerned, British advisers and instructors in nearly every case.

Thus the early Japanese engineers were not only thoroughly imbued with a predilection for British plant, but their engineering education was all absorbed on British lines. The intimacy between the Japanese student and the British professor not only accentuated that leaning towards British products in the early days, but its influence has continued even to this day, though the Japanese now consider that they are no longer in need of European advice.

In China matters are on quite a different footing: There are some eight nationalities vying with each other in lending money to China for industrial enterprises, and clamouring for industrial concessions. Out of these countries Great Britain is the only one who does not couple with her financial assistance some stipulation as to a *quid pro quo* from China. The other nations habitually stipulate that the money shall be spent largely on plant from the country in question, or that engineers of that nationality shall be employed in connection with the undertaking for which the money is found. China is forced to take her advisers from the countries who lend her money, and the result is that British influence is being ousted.

The Diplomatic and Consular Conditions.

The foreign diplomatic and consular services in China in every case, with the exception of the British, are leaving no stone unturned to force the trade into their own respective countries. The British Government are apathetic on this subject. It is true that of late years they have gone to some trouble to issue reports more systematically and of a better quality than in times gone by, but their organisation for collecting information, though expensive, is still less effective than that of other Powers. Thus Britain's foreign competitors are better informed.

German and American Influence on Education.

Britain's two strongest competitors, Germany and the United States, are making a very serious bid for the education of the Chinese engineer. The Germans, with their model dockyard at Tsingtao, have properly organised engineering works where young Chinese of the right class are encouraged to attend and learn thoroughly, not only the German language, but engineering and dockyard practice, and large sums of money are expended in bringing to Germany the right class of Chinese for their engineering training.

Then, again, German manufacturing engineers on their own account have an association for dealing with their overseas interests, and have subscribed a large sum for the purpose of creating three purely German engineering schools in China. These schools are to be effective nurseries for the German machinery trade. German diplomacy, too, has succeeded in introducing the German professorial element very largely into Chinese native schools.

The Americans have gone a step farther. The waived a portion of their war indemnity against China after the Boxer rebellion on the understanding that that money should be spent in sending over the right class of Chinese to the United States for the purpose of theoretical and practical education.

Both the United States and Germany have their own journals catering for Chinese requirements, and in them engineering and industrial matters generally are preponderating. One of these German journals has an English title, and is printed throughout in English.

Thus on the one hand the Germans are spending large sums of money to create and foster a knowledge of the German language by their technical schools, and on the other are utilising the English language to secure trade pending the realisation of their scholastic ideals.

The Banking Facilities of Other Nations.

The German, the American, the French and the Belgian banks are all strengthening the hands of their respective manufacturers in every way. They give facilities for financing large contracts which are unobtainable by British firms from their own bankers, and which constantly tell against British chances of business. One of the most serious results of this policy is that often by the time the British manufacturer hears that an order is to be placed and is offered an opportunity to tender, the whole matter is cut and dried and the fact that the contract is to be placed with one or another of the foreign firms is a foregone conclusion.

Another influence which very often tells against British interests in China is the attitude of certain merchants who, while professing to represent British firms and to study British interests, are subject to all sorts of international influences which make it impossible for them to regard matters from the same point of view as the British manufacturer.

The Collective Influence of British Engineers.

It is to overcome all these obstacles to the legitimate progress of our trade that the British Engineers' Association has been formed, and the lever to be used is the collective influence of British engineering firms.

There is an immense amount of dormant influencein the engineering industry of this country, comprising, as it does, firms whose weekly wages bill amounts to over £2,000,000. It will be the business of the Association to transform that dormant influence into an active force to be utilised, not for the benefit of any individual manufacturer, but for that of the British engineering trade, so far as it is represented by the members of this Association.

MINING NOTES

Paracale Dredging Operations.—The new P.280,000 dredge which is being installed by the Philippine Exploration Co., on their claim at Gumaus was to be completed by the middle of September and the company expected to be taking out gold a couple of weeks later. Judge Frank B. Ingersoll, president and general manager of the company, states that an Australian company is working two dredges in the river at the town of Paracale. They had an old New Zealand dredge. This concern was incorporated as the Philippine Dredging Proprietary, Ltd. The Philippine Dredging Syndicate was operating a Risden dredge in the Malaguit River and was taking out about 300 ounces of gold a month. Up in the country at the junction of the provinces of Rizal, Tayabas and Nueva Ecija on the upper waters of the Umerai river the Luzon Gold Company was taking out gold, using hydraulic power.

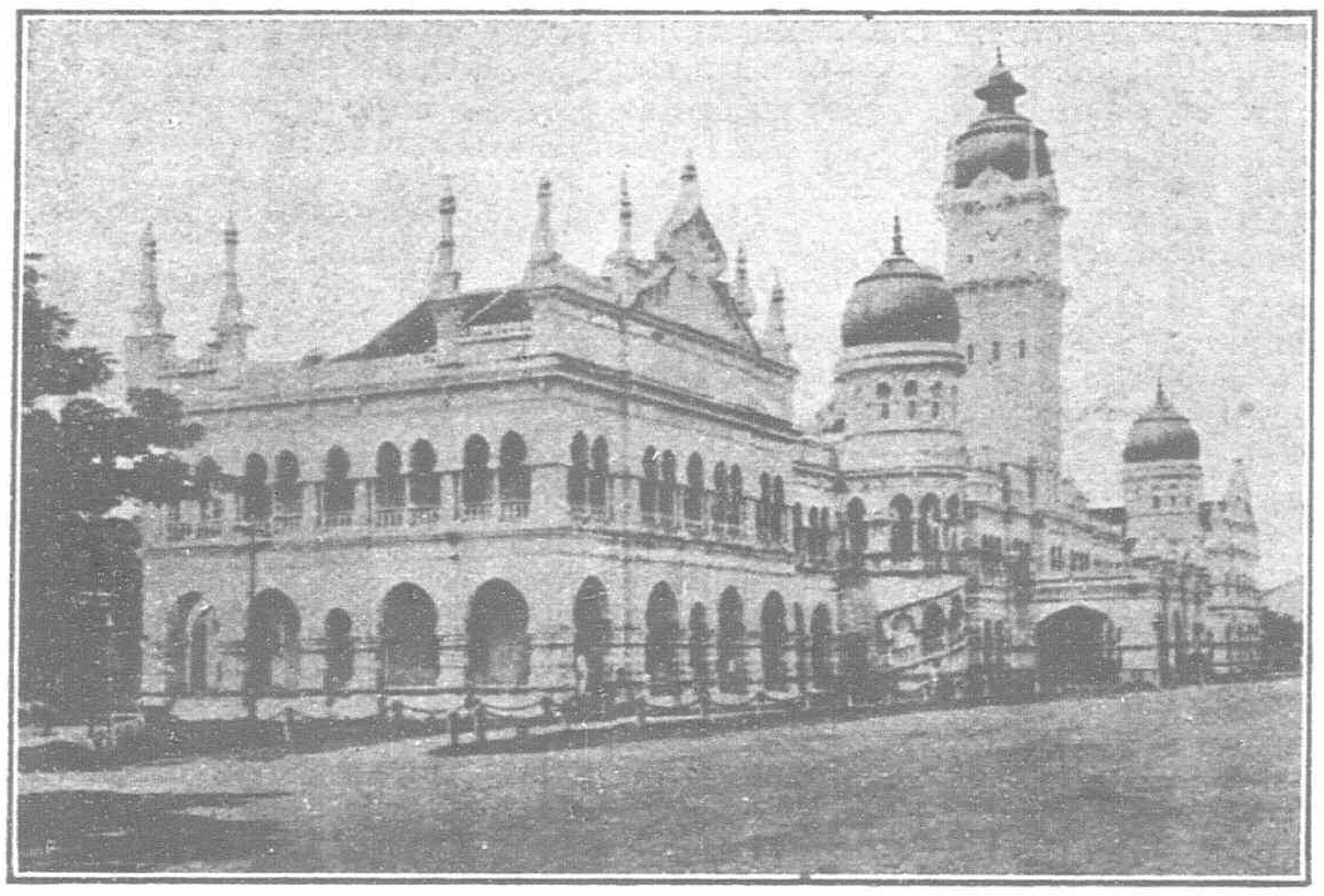
Siamese Tin.—The Siamese Tin Syndicate is regarded as having a future of promise, writes *The World*. Founded in 1906 to explore and prospect for tin, and to engage in general industrial enterprise in Siam, it secured strong backing in the market, which was largely due to the management being controlled by Mr. H. G. Scott, who was previously consulting engineer to the Siamese Government, which position he resigned to conduct the fortunes of the syndicate.

The chief asset of this undertaking is a tin property of 700 acres, situate about two miles from the sea, with which it is connected by a light railway. Before installing the dredger which is now in operation, the ground was carefully prospected, between six hundred and seven hundred boreholes having been drilled in the survey of the estate. Results are now being attained of a highly satisfactory nature, and working expenses are estimated not to exceed 15 per cent. of the total revenue.

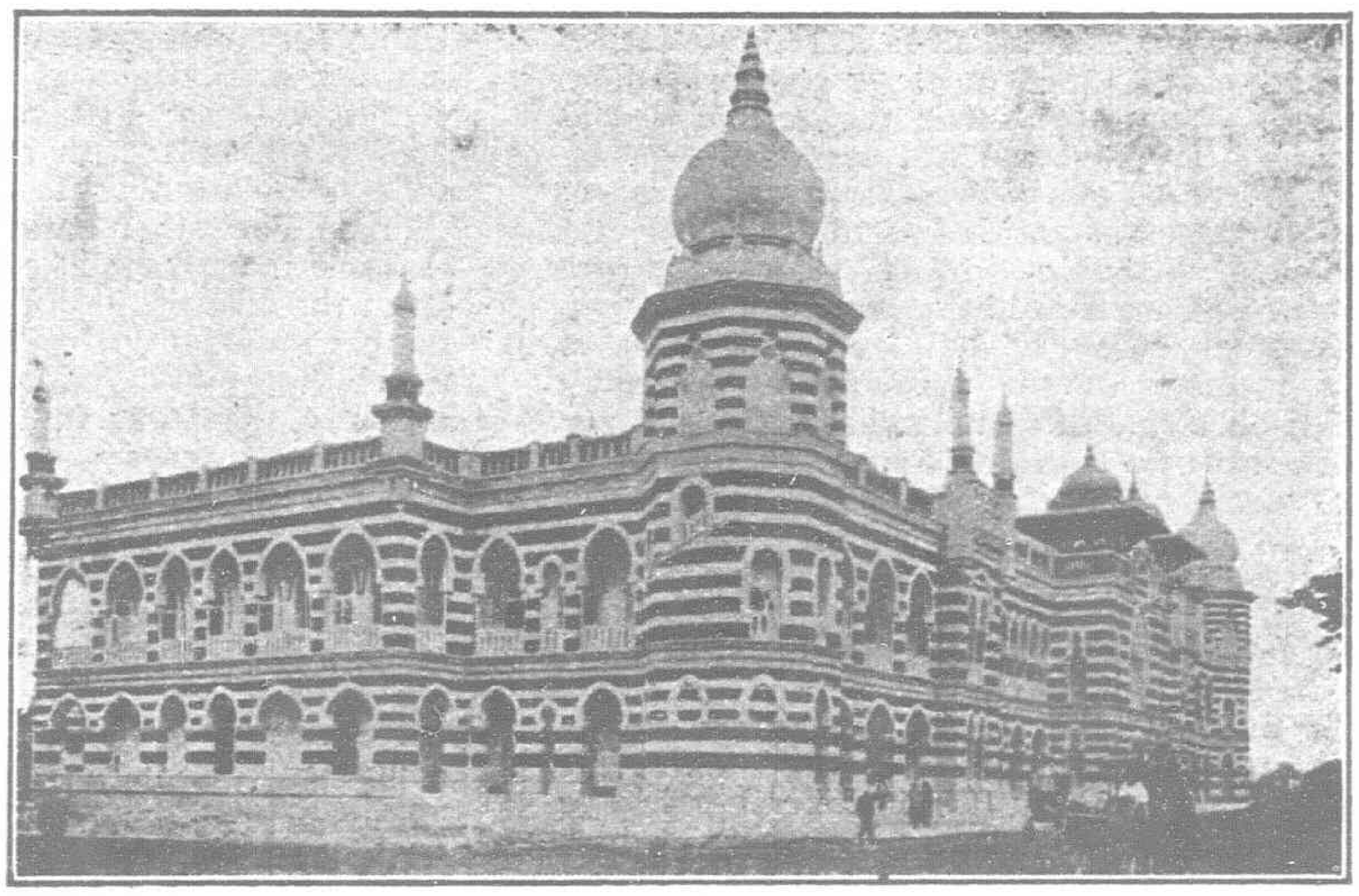
For the latest period of a fortnight, 21¼ tons of tin were produced. At the price of £144 a ton, this equals £3,060. If this rate should be maintained, it would mean a gross revenue for the year of £79,560, less working costs totalling £10,634, or a net result of over £68,600. This, however, is not regarded as the limit of possibility. Since the date of the last report, the issued capital of £100,000 has been increased to £120,000, the full amount authorised, and the extra £20,000 is estimated to have produced close on £40,000, or sufficient to provide two more dredgers, which will be ordered as soon as their designs are approved. The life of the property with three dredgers at work is estimated at seventeen years.

FEDERATED MALAY STATES RAILWAYS

By Commercial Agent D. C. Alexander, Jr.



F. M. S. GOVERNMENT OFFICES AT KUALA LUMPUR



HEAD OFFICES OF THE F. M. S. RAILWAYS AT KUALA LUMPUR

The Federated Malay States Railways, now one unified system controlled by the Federal Government, had their origin in a number of small lines constructed by the States of Perak, Selangor, and Nigri Sembilan between 1885 and 1903, in which latter year the Federal Government assumed control. These small lines were built for the purpose of connecting the principal cities of the various States with the nearest seaports, and were then gradually extended as the development of each State required. For example, the first line joined Taiping, then the center of the tin-mining district of Perak, with Port Weld, while the second was built between Kuala Lumpur, then capital of Selangor and now capital of the Federated States, and Port Swettenham.

In all, about 280 miles of line were in operation when the Federal Government assumed control, and the open mileage was increased to 559 by December 31, 1911. On that date there were also under construction 389 miles of new line, of which 137 miles (principally in the East Coast Division, are now completed, making a total of 696 miles. In addition, the railway administration operates, under lease, the Singapore (Island) Railway (19 miles) and the Johore State Railway (121 miles), making a total of 836 miles operated by the Federated Malay States Railway. All of these lines are of meter (3.28 feet) gauge and about 25 per cent of the Federated Malay States line is laid with 80-pound rails, the remainder being 60-pound.

New Construction Work—Motor-Car Service.

The so-called East Coast Railway, from Gemas northward through Pahang, is being rapidly pushed toward the Kelantan border, and the survey is now being made for the line through Kelantan which will connect the Federated Malay States Railways with the South Siam Railway, now under construction. During 1912 work will be begun on two branch lines, one from Padang-Java to Kuala Selangor, and the other from Bukit Mertajam to Alor Star, in the new Province of Kedah; the two lines comprise 89 miles. In all, about $3,000,000 will be expended on new construction in 1912.

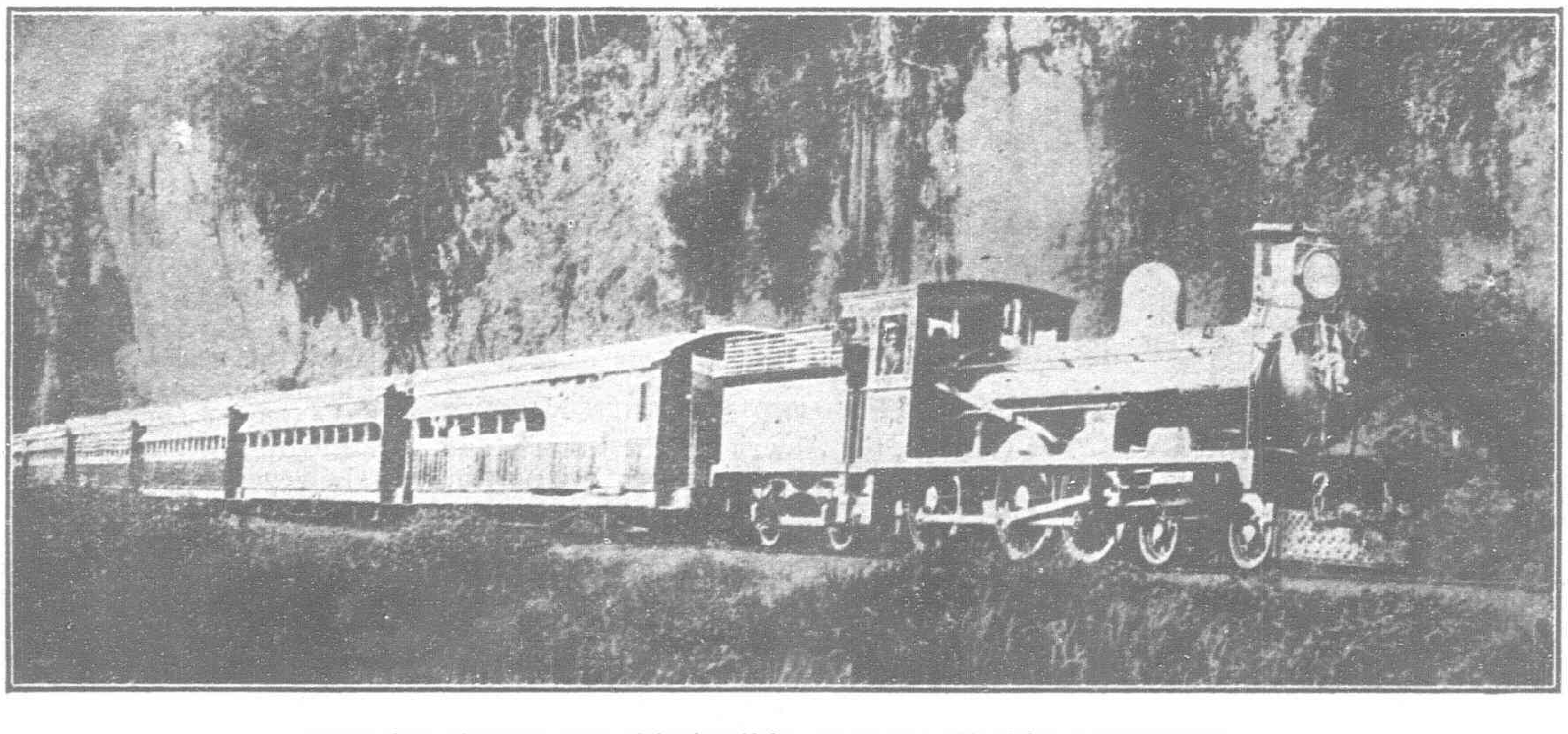
On December 31, 1910, the capital expenditure on 539 miles of open line was $29,004,350, or $53,889 per mile, while the net earnings in the same year were $1,263,470, or 4.35 per cent. In 1911 the net earnings increased to $1,870,326, which was 6.03 per cent on capital cost. As all construction charges have been paid from earnings and appropriations from the general revenues of the States, the railway has no indebtedness.

Besides its rail service, the railway administration now operates a motor-car service for passengers, mail, and parcels between Klang and Kuala Selangor (28 miles) and between Kuala Kuba and Kuala Lipis (80 miles). While this service, considered alone, has never paid its way (the loss in 1911 was $30,605), it has undoubtedly had the effect of increasing the earnings of the rail lines considerably and has contributed much toward opening up sections remote from the railway. In this, as in some other respects, the benefits of a State-owned line are obvious. In 1910, 45 motor cars were in operation, including 6 motor trucks, the total number of miles run being 311,254 and the total number of passengers carried 249,894.

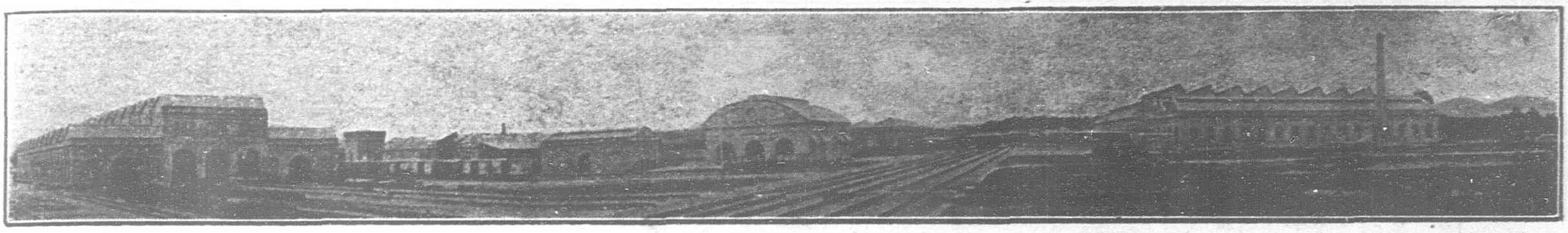
Railway Equipment.

In February, 1912, there were in service 114 locomotives, of which 33 were of the Pacific type, 38 of the 4-6-0, and 43 smaller. Plate-frame construction, with copper fire boxes and stay bolts, is used exclusively, and all locomotives are from British builders, principally from Kitson & Co. and Nasmyth & Wilson. The overhauling and shopping of locomotives appears to be very thorough, yet the cost of repairs (wages and materials) was only $0.0312 per train-mile in 1910 and $0.0344 in 1909.

There are 2,229 freight cars of all classes in use. As in the passenger coaches, the underframes, bogies, and wheels are imported, while wood and plate work are constructed locally. Of 271 passenger coaches, 161 are third class and 66 are four-wheeled. All of the third-class and many of the first and second class coach bodies have been built locally, but some sleeping and dining cars have recently been imported. The new sleeping cars, which were built in England, are equal if not superior in roominess



EXPRESS TRAIN ON FEDERATED MALAY STATES RAILWAYS



F. M. S. RAILWAY WORKSHOPS, AT KUALA LUMPUR, LOOKING WEST

and comfort to any that the writer has seen in the United States, Europe, or the Orient. They are 57 feet long, 8 feet wide, and 11 feet 8 inches high, and vestibuled, corridor, compartment style. A novel feature of the design is that at the middle of the car the corridor crosses from one side to the other by a sharp diagonal. There are 8 two-berth compartments, each 7 by 5 feet, and each has four electric lamps conveniently arranged and built-in wash closets. In addition to the usual toilet rooms, each car has a small shower-bath room.

CENTRAL WORKSHOPS—FOUNDRY—FORGE AND BOILER SHOPS.

The main shops are situated about 3 miles from Kuala Lumpur, where the railway administration has its offices. These shops are of brick and steel construction, and are, in general, well designed, except that the tracks in the erecting shop run lengthwise instead of transversely, which makes the handling of locomotives difficult.

Power for the works is generated at a Government-owned hydro-electric station at Gombak, some 12 miles away. The turbines in this station are from Escher, Wyss & Co., of Zurich, while the two 300-horse-power dynamos are from the Oerlikon Co., of Winterthur, Switzerland. Three-phase current is generated at 6,000 volts, which is transformed to 400 volts at the works. After 6 p.m. the same power plant supplies current for lighting the city of Kuala Lumpur. As a reserve a steam engine and 75-kilowatt dynamo are installed in a small engine room at the works, which also contains the transformers, switchboard, and an air compressor. This compressor is a small duplex machine, driven by a 25-horsepower motor, with the cylinders mounted upon the receiver, which results in a very unpleasant clatter when the compressor is in use.

The foundry contains one 5-ton cupola and two small brass furnaces but no molding machines. In the tube and bolt shop, which adjoins, there are three 1-inch bolt cutters from the Acme Machinery Co., of Cleveland, Ohio, and two forging machines from the same company. One of the latter machines was running rather noisily, either from wear or improper adjustment.

The forge and boiler shops now occupy separate bays in one building, but as the space has become too small a new forge shop has just been built close to the railway siding, which will be used principally for building and repairing cars and for general plate work. The present shop contains 19 smith and 22 round fires, and 2 steam and 1 motor pneumatic hammer. The latter, which is of 5 hundredweight, is from Nasmyth & Wilson, of Manchester, who have also supplied one 10-hundredweight steam hammer, while the other steam hammer of 5 hundredweight is from B. & S. Massey. There are also in this shop a case-hardening furnace, a spring furnace, and a spring-testing machine, the latter from J. Buckton, of Leeds.

The boiler shop is served by a 15-ton overhead traveling crane, three-motor type, with 5-ton auxiliary lift, and the equipment includes a single-acting triplex motor-driven pressure pump with accumulator, giving 1,500 pounds pressure, and 3 hydraulic riveters from Fielding & Platt, 1 stationary with 8-foot gap, and 2 portable. There are 3 combination punching and shearing machines, the largest from G. Wilkinson & Sons, of Keighley, having a capacity up to 1¼-inch plates. There is also a two-speed portable air drill, a plain radial drill, bending rolls, and a cold saw.

MACHINE SHOP EQUIPMENT.

The machine shop is built in three bays. The central bay, the erecting floor, has three lines of rails through its entire length and two 20-ton overhead traveling cranes of the same type as that in the boiler shop. These were built by Ransomes & Rapier (Ltd.), of Ipswich, England. One of the side bays contains a tool room and workbenches, and the other bay contains machine tools of all classes grouped by kinds. Most of the more modern machines have individual motors, a few of the small ones being driven by group motors. In all there are some 80 motors, aggregating about 625 horsepower. Some of these are from the Oerlikon Works, one or two from the General Electric Co., of New York, and the remainder from the British Thomson-Houston Co., of Rugby.

The wheel-lathe section of this shop contains five lathes, one 48-inch swing, three 62-inch, and one 72-inch. Three of these, including the 72-inch lathe, are from Craven Bros., of Manchester; the others are from J. Butler, of Halifax, and from Shepherd & Hill, of Manchester. In all cases the working speed appeared to be considerably less than that customary in American and European shops. Most of the car wheels in use on this railway are of the built-up type, with tires shrunk on and secured by a modification of the Gibson ring. The standard sizes of wheels are 24 and 33½ inch.

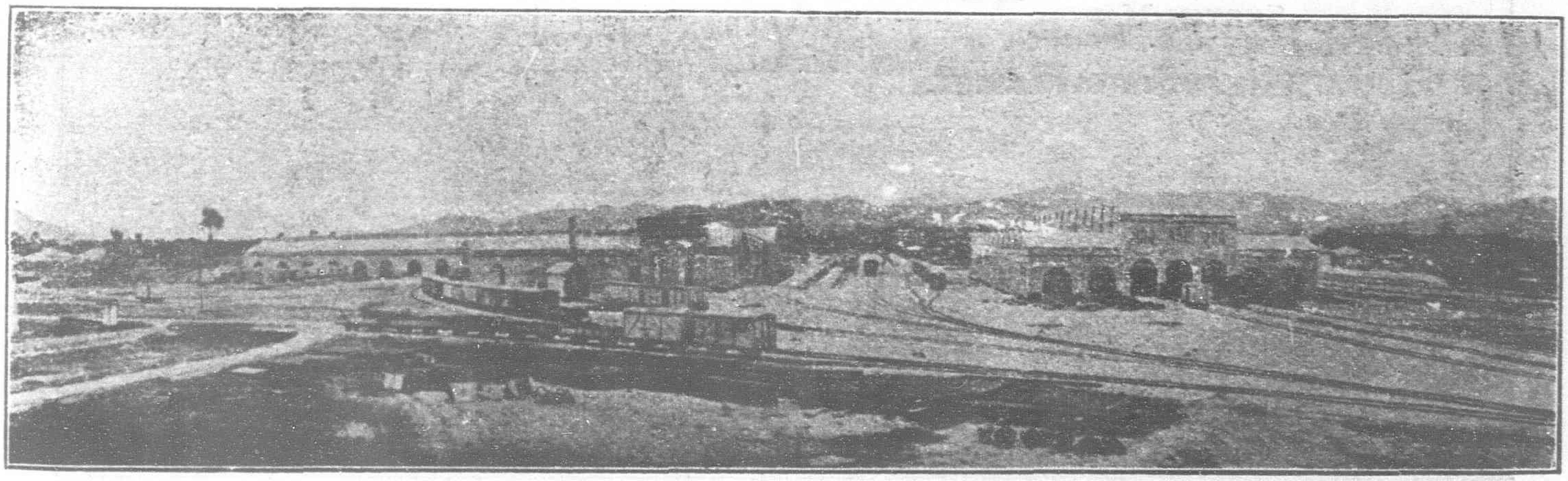
Few of the smaller machines are of particular interest, and, considering the comparatively recent date of their purchase, it can hardly be said that, as a whole, they represent the best possible choice. When new machine tools and machinery are required, a specification is sent to the Crown Agent for the Colonies, in London, who makes the purchase. The general manager of the railway states that, as a rule, the administration in Kuala Lumpur does not specify particular makers in the indents, preferring to give the Crown Agent a free hand in the selection, but that, if a particular machine is asked for, the Crown Agent will purchase and supply it.

Most of the engine lathes (ranging from 14 to 36 inch swing) and four capstan lathes are from John Lang & Sons, several having the patent variable-speed drive, which has not been altogether satisfactory here. Several of the smaller ones, used principally for brass turning, have a thread-chasing attachment, which is reported as very convenient. Shepherd & Hill have supplied two large lathes which were well spoken of, one of 36-inch swing and one 48-inch swing with 24 feet between centers, and two tool rests.

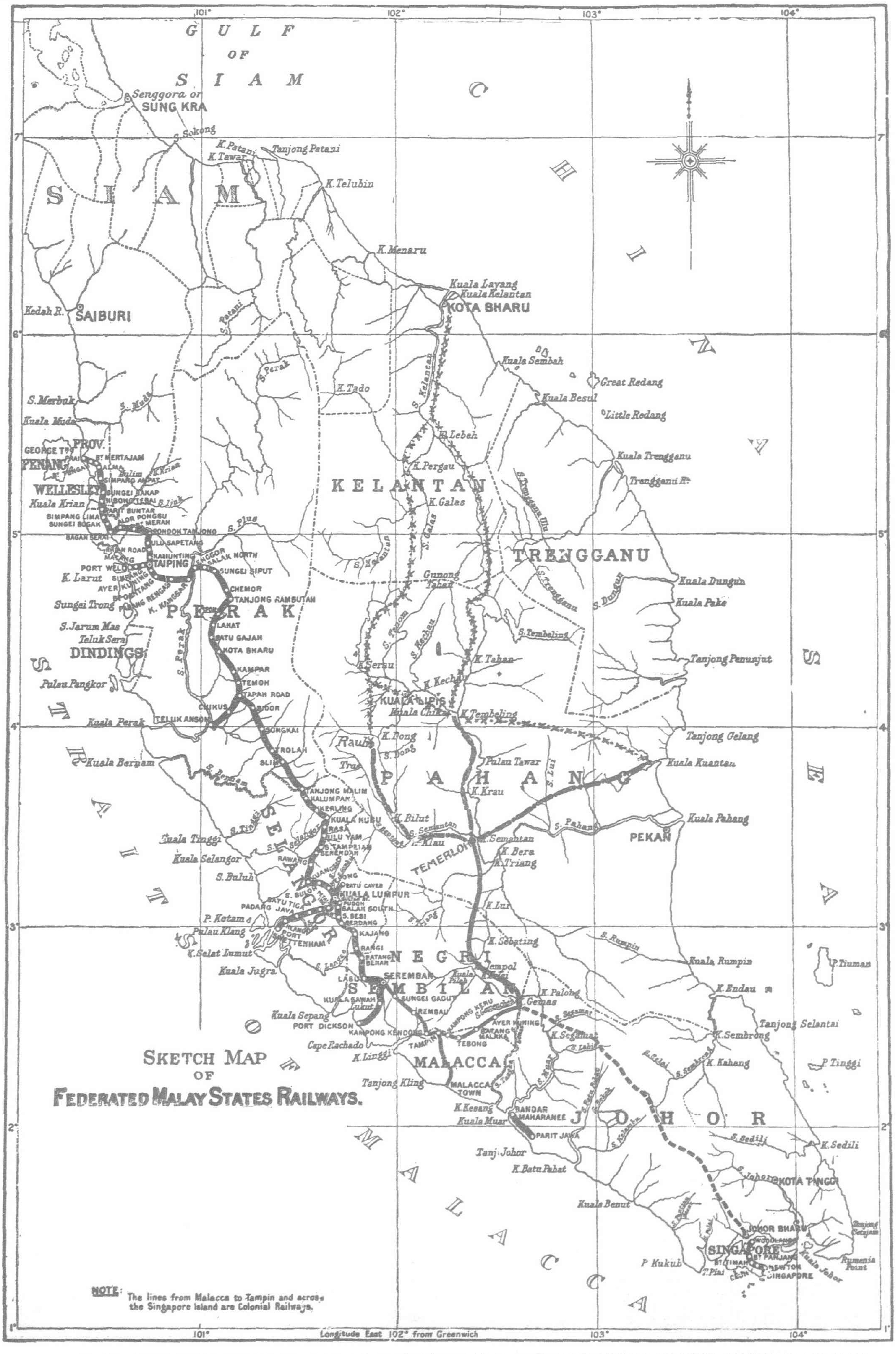
From Jones & Lamson, of Springfield, Vt., there are three flat turret lathes (two 2-inch and one 3-inch), which were most highly commended and showed no signs of wear; notwithstanding this fact, one of Alfred Herbert's No. 2 hollow hexagonal lathes has recently been ordered, and will be tested against the American machines.

In these shops the milling machine does not play the important part that it does in the best American and European shops. This is due partly to the inability or unwillingness of the workmen to utilize such machines as there are, and partly to the fact that the machines now installed are not equal to heavy work with modern high-speed milling cutters. The present equipment includes three universal and one 2-spindle vertical machines, the makers represented being Shepherd & Hill, Alfred Herbert, and Buck & Hickman.

William Muir, of Manchester, has supplied one horizontal boring, turning, and milling machine taking diameters up to 30 inches, and several upright drills, all excellent machines. There are three traverse shapers, and four planers of various sizes and makes (the latter rather underpowered), and one 30-inch vertical turning and boring mill with one head, from Smith & Coventry, of Manchester. The full possibilities of this type of tool do not seem to have been realized yet by the shop management.



F. M. S. RAILWAY SHOPS AT KUALA LUMPUR, LOOKING NORTH



SKETCH MAP OF FEDERATED MALAY STATES RAILWAYS.

NOTE: The lines from Malacca to Tampin and across the Singapore Island are Colonial Railways.

THE DOTTED LINE FROM GEMAS TO JOHORE, INDICATING THE JOHORE RAILWAY IS NOW OPERATED BY THE F. M. S. RAILWAY ADMINISTRATION

Five sensitive drills are in use and two 6-foot plain radials, the latter from Craven Bros. and Shepherd & Hill. There is also a 24-inch slow-speed cold saw from Clifton & Waddell, and the usual wheel press, tire-drilling machine, and polishing and buffing machine. The absence of grinding machines in the machine shop has just been remedied by the arrival of a large plain grinder, with 10-inch swing and 12 feet between centers, manufactured by J. E. Reinecker, of Chemnitz. This machine has not yet been put into use.

The tool room contains a No. 1 universal tool and cutter grinder from the Norton Grinder Co., of Worcester, Mass., and a floor grinder from the same firm. The tool and cutter grinder was highly praised by the shop foreman. Workingmen's time is kept by two recording clocks from the International Recording Clock Co., of Rochester, N. Y., which are said to be very satisfactory.

Woodworking and Carriage Shop.

All the woodworking machines are from British makers, principally T. Robinson & Son, of Rochdale; A. Ransome & Co., of Newark-on-Trent; and W. B. Haigh, of Oldham. The first named has supplied one large frame saw, one 2-spindle drill, one 4-side automatic-feed planer, and grinders for circular saws and planer cutters. From Ransome & Co. there are a large circular log saw with automatic carriage, one vertical boring and mortising machine, one tenoning machine, one horizontal board sawing machine, and an automatic band-saw grinding and setting machine. The Haigh machines are two hand-feed planers, two circular-saw benches, one 2-spindle shaper, two panel planers, and a panel scraping machine.

Where durability and strength are required, the wood principally used is chengai—a hard, red-colored, native wood, weighing 64 pounds per cubic foot. For interior work, meranti, a white, fibrous, native wood is employed to some extent, but is not altogether satisfactory since, on account of its coarse composition, it checks and splits and has very little strength.

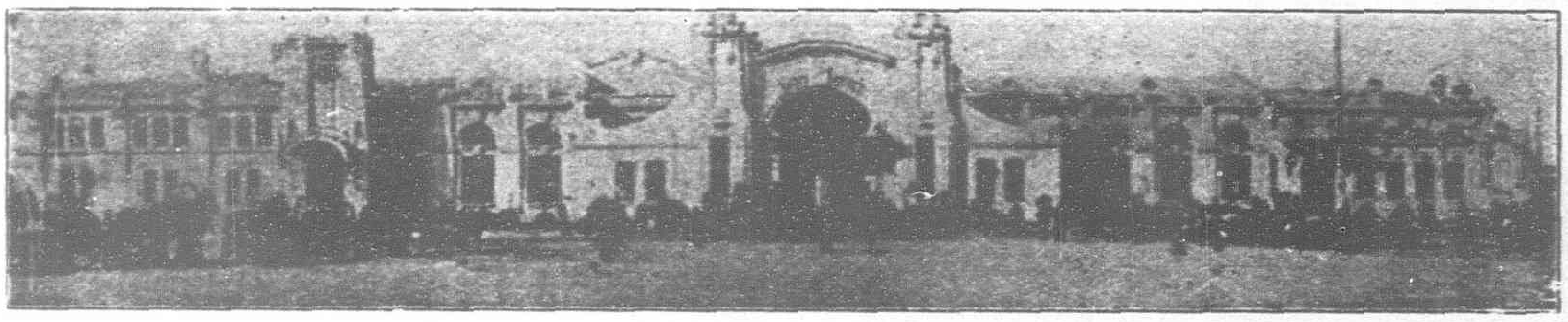
Workmen and Wages.

Throughout the shops a majority of the workmen are Chinese, the smiths, boiler makers, carpenters, pattern makers, and molders being of that race almost without exception. The machinists and fitters are principally Tamils (from the Madras Presidency of British India), though some Cingalese and Chinese are also employed for this class of work. The advantage of Tamil machine men seems to lie in the fact that they are more permanent in any employment than the Chinese and more open to instruction, though it can not be doubted that, in general, the Chinese are by nature the better machinists.

Wages are paid by time to most of the workmen, and are fairly high for this part of the world. Smiths and boiler makers receive $0.66 per 8-hour day, machine men $0.33 to $0.72, fitters $0.33 to $1.29, carpenters $0.41 to $0.77, and pattern makers $0.77 to $1.29. The rate for all apprentices is $0.16½. Most of the castings are made by contract with a Chinese master foundry man, who receives $0.77½ per hundredweight for iron castings, and pays his own helpers, the iron and fuel being supplied by the railway company.

It appears that American machine tools and woodworking machinery are not very well known among the managers of these shops, though several of them are men of wide experience in the best English railway shops. However, such American machines as are in use were generally commended, and the catalogues and proposals of manufacturers who can offer tools of special application and merit will doubtless receive interested attention.

DEVELOPMENT OF NORTHERN MANCHURIA, HARBIN



THE RAILWAY STATION AT HARBIN

Soya Beans

Practically the entire soya-bean crop of North Manchuria is shipped over the Chinese Eastern Railway through Suifenho, for exportation from Vladivostok. All the beans shipped from that port come from North Manchuria, so that the exports from Vladivostok give the most accurate figures obtainable of the foreign shipments of North Manchurian beans. Making allowances for stock on hand at the beginning and end of the year, it is estimated that 466,567 tons of beans were shipped during 1911, their estimated value at Harbin being $7,600,376. The average value per ton at Harbin in 1911 was $16.29. Expenses, bags, and freight brought the price f. o. b. Vladivostok up to $24.22.

The southern movement of soya beans through Kuangchengtzu and destined for the oil mills of South Manchuria or for exportation via Dairen or Newchwang is relatively small, although it was in 1911 undoubtedly greater than the 18,923 tons shown by the returns of the Chinese Eastern Railway. To take advantage of the lower freight rates of the South Manchuria Railway, which are designed to encourage the exportation of beans through Dairen, farmers in the southern part of this consular district cart their beans to Changchun rather than ship them north to Vladivostok via Harbin.

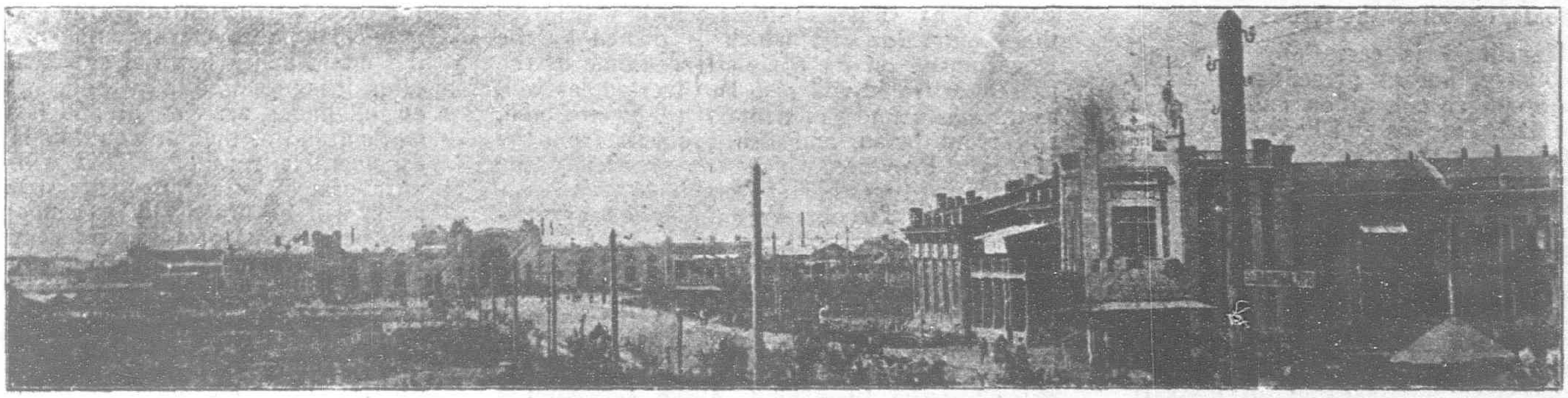
Bean and Hempseed Oil Output—Breweries

Scattered throughout this district are a number of small oil mills, but the methods used are very crude and the production is only sufficient for local consumption. One oil mill at Harbin produces hempseed oil specially prepared for use in paint. This mill has a capacity of about 22 tons of hempseed a day, from which 20 per cent of oil is obtained. The prices per pound obtained were as follows: Light color, first grade 71 cents, second grade 57 cents; dark color, first grade 62 cents, second grade 60 cents. Hempseed is also shipped from this district to an oil mill at Nicolsk-Ussurisk, which produces oil for cooking and for paint. This mill consumes annually 4,000 tons of hempseed and 2,000 tons of soya beans, obtaining 22 per cent of oil from hempseed and 12 per cent from soya beans. Bean oil sells for 64 cents per pound at the mill, hempseed oil for 75 cents, and oil for paint for 85 cents. The bean cake is sold to Japan and the hempseed waste is ground for cattle feed and sold locally. Most of the beans and hempseed for this mill come from Manchuria, the rest being grown in Chosen near the border of the Maritime Provinces.

There are seven breweries in Harbin, with a total annual capacity of 337,500 gallons, and one at Imianpo Station, with an annual capacity of 67,500 gallons. Under an agreement among the Harbin brewers, only four of the seven breweries were operated in 1911.

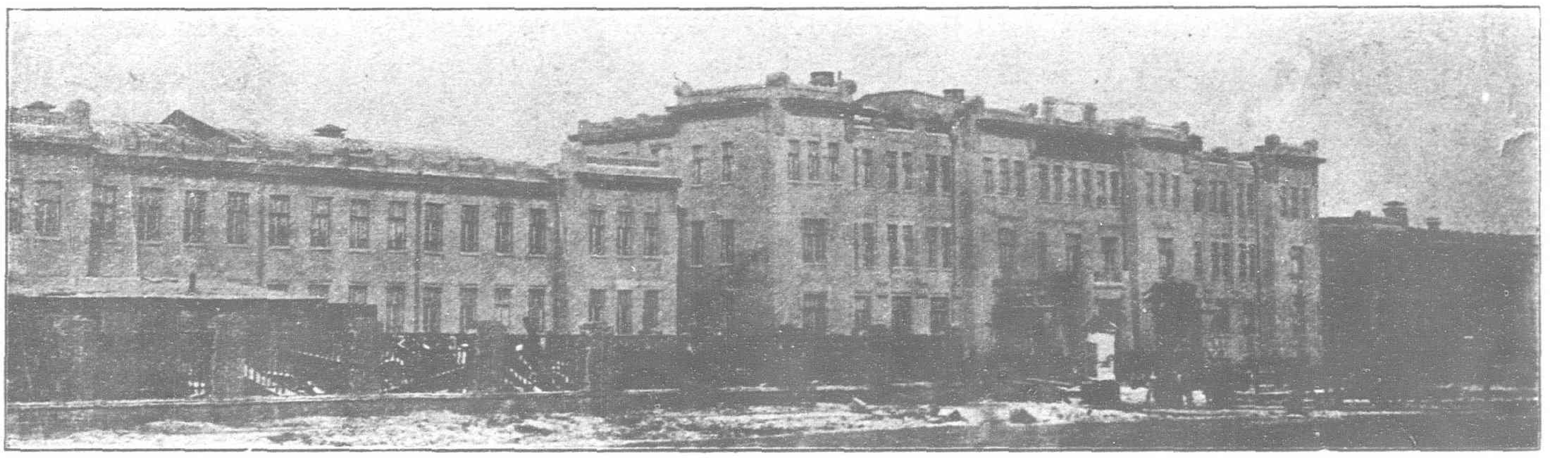
Manchurian Industries—Candle Making—Coal Mining

Harbin has two candle factories and Fuchiatien two. One of the Harbin factories



MAIN STREET OF HARBIN, LEADING TO RAILWAY STATION produced about 700 tons of candles during 1911. The other, a new one, was not put into operation during the year. The latter plant has a daily capacity of 100 boxes of 72 pounds each. The two Chinese factories at Fuchiatien produced 9,300 boxes in 1911, with a total value of $55,851. Candles made at Harbin sell for 8.8 10.7 cents per pound, those made at Fuchiatien for about 8 cents. About 30 per cent of stearin is used in making the candles. German stearin costs 10 cents a pound for the best quality and paraffin 5.5 cents a pound, delivered at Dairen.

One coal mine is operated in North Manchuria, about 20 miles from Manchouli. This mine is owned by the Chinese Eastern Railway, but is leased to a local capitalist, who is required to sell the coal to the railway company for 71 cents per ton at the mine. The coal is soft brown lignite, poor in quality, with a large percentage of moisture and slacks when exposed to the air. There is also great danger of spontaneous combustion. When the requirements of the Chinese Eastern Railway have been met, the lessee of the mine is at liberty to sell to other buyèrs, and has agreed to supply coal to the Trans-Bikal Railway for $2.266 per ton, delivered at Manchouli. During 1911 the sales to the Chinese Eastern Railway totaled 109,000 tons and to the Trans-Bikal Railway 45,500 tons.



THE GREAT ADMINISTRATION BUILDING OF THE CHINESE EASTERN RAILWAY AT HARBIN

Flour and Wheat—Sugar Mills

There are 10 flour-milling companies in the neighborhood of Harbin, which consumed 135,000 tons of wheat in 1911, the total output of flour being estimated at 92,412 tons. With the usual abundant wheat crops of this region, there is little opportunity for foreign flour to enter the market, except in case of a local crop failure. The freight rates per 2,000-pound ton for flour from Harbin to the principal markets are as follows: Blagovestchensk, steamship, $5.66; Khabarofsk, carload lots, $8.50; Iman, carload lots, $8.70, steamship, $4.25; Kuangchengtzu, ton rate, $2.60, carload lots, $1.64; Manchouli, ton rate, $8.30; Suifenho, ton rate, $6.17; Vladivostok, carload lots, local rate $7, special export rate $5.38. From April to October the railway rate to Khabarofsk is lowered to $7.08, owing to competition from the river boats, on which the rate is $2.83.

North Manchuria is essentially a wheat-growing country, but at present a relatively small area is under cultivation and the soya bean ranks first. Floods and heavy rains destroyed about 40 per cent of the wheat crop in 1911. The Chinese Eastern Railway moved 67,984 tons of grain as local freight in 1911, 158,839 tons as export freight, 928 tons as import freight and 2 tons as transit freight.

There is a sugar factory at Ashiho with a capacity of 7,300 tons of sugar a year, but competition with imported sugar and the small demand limited its output in 1911 to 1,500 tons of granulated sugar and 700 tons of cube. It planned to plant about 13,500 acres with sugar beets in 1912, supplying the Chinese farmers with free seeds, paying them $2.05 per acre for labor, and buying the beets at $2.12 a ton. An ordinary crop of beets will yield about 7 tons to the acre, and a good crop as high as 11 tons. Two thousand tons of granulated and 4,000 tons of cube Russian sugar, including the output of the Russian sugar factory at Ashiho, were sold along the Chinese Eastern Railway and at Harbin in 1911. The average wholesale prices per pound at Harbin were as follow: Chinese, white, 4.3 cents, brown, 3.5 cents; Hongkong, 3.7 cents: Japanese, 3.4 cents; Russian, cube, 4.8 cents, granulated, 3.8 cents; local, cube, 4.2 cents, granulated, 3.6 cents.

Distilleries—Tea Shipments—Timbering

Small distilleries are scattered throughout North Manchuria. The largest at Harbin, has an annual capacity of about 670,000 gallons, and about an equal amount is imported yearly from Russia. Harbin consumes about 108,000 gallons a year, about 675,000 gallons are exported annually to the Amur Province and to towns on the Chinese side of the Amur River, and the rest is distributed along the Chinese Eastern Railway. The average price of spirit is 44 cents per gallon. Vodka sells for 25 to 57 cents per gallon.

Railway Situation—Harbin's Prosperity Threatened.

The most important trade artery of North Manchuria is the Chinese Eastern Railway, to the construction of which this region owes its development. This road showed a profit in 1910 for the first time, the amount being estimated at $800,000. In 1911 it is estimated that the profits totalled $2,000,000. The private freight handled rose from 606,070 tons in 1908 to 1,361,026 tons in 1911, while the number of passengers carried in the latter year was 1,207,953. The grand total revenue of the road for the year was $9,667,423.

The completion of the Amur Railway may check Harbin's rapid growth, as any loss to the Chinese Eastern Railway is bound to react unfavorably on Harbin. The latter railway derives considerable revenue from transportation of the military and emigrants to the Russian Far East, business which will go to the Amur Railway, which is owned by the Government, on its completion. Some of the passenger traffic will also be diverted, as well as the westbound shipments of tea from China, silk from Japan, and fish products from the Maritime Province, which are practically the only items of westbound freight.

Should the Tsitsihar-Aigun line be constructed it will stimulate the commerce of North Manchuria, but will tend to further isolate Harbin and to divert part of the export freight from the Chinese Eastern Railway to the cheaper transportation via the Amur River to Nikolaiefsk. The proposed railway through Khiakta and Urga to Peking would shorten the distance for passenger traffic from Europe to China, but would cause Harbin to lose its present position as transfer point for this traffic.

To offset these losses it will be necessary to encourage lemburing and mining, as well as agriculture, to provide freight for the railway. The shipments of soya beans, great in themselves, are not large enough alone to support a railway. Although the growth of Harbin may be adversely affected by these changes, North Manchuria as a great agricultural district will be benefited.

River Navigation—Harbin's Commercial Turnover.

The Sungari River, the largest watercourse in North Manchuria, is navigable from the southern to the northern end of this district and as a trade route ranks second to the Chinese Eastern Railway. In 1911 the total number of vessels entered and cleared at the river customhouses of Harbin, Aigun, and Sansing was 8,600 of 965,003 tons. Of these, 2,142 of 837,749 tons were Russian steamers, 46 of 11,081 tons were Chinese steamers, and 6,412 of 116,173 tons were Chinese junks. The freight carried during the year by river vessels totaled 211,487 tons. The steamers of the Chinese Eastern Railway maintain regular service between Kirin and Taolaichao and between Bodune and Lahasusu from April to the end of September.

Notwithstanding the handicaps which the city of Harbin suffered in common with the rest of this district during 1911, the commerical turnover of the city during the year was about $40,000,000, including imports and exports as as well as local manufactures and consumption.

Plans for a Tramway—Effect on Imported Goods.

The Harbinski Viestnik, in referring to the proposed construction of tramways in Harbin, makes a plea to Russian subjects to become interested in the matter, so that the line may be built by Russians with Russian capital, and thus keep out non-Russians.

The matter of tramways is now being considered by the municipality, and the present plan is to try and float a 2,000,000 rouble ($1,030,000) loan, and if this is successful, to let contracts for the construction of a tramway, and other municipal improvements and enterprises. As the municipality has not sufficient security to offer, it is proposed to introduce a "pood tax" on all goods arriving at and leaving Harbin station, and as the tax would be high, it means considerable revenue. This will be a most unfavorable tax as affecting American goods, as it will be practically an import duty, and will be a means of forcing revenue from non-Russian foreigners to make up for the foreign firms now doing business in Harbin who refuse to pay taxes. Most of these firms are engaged principally in exporting from the surrounding country, and by shipping from stations outside of Harbin, will avoid the "pood tax," which falls almost entirely upon goods destined for Harbin. (Am. C. R.)

RAILWAYS

Chefoo-Weihsien Railway:—A meeting attended by upwards of 300 prominent Chinese was held at Chefoo on Sept. 6 to discuss the construction of a railway between Chefoo and Weihsien. A committee was appointed to make the necessary arrangements. It is understood, says the *China Tribune*, that the representations of a special committee of the China Railway Association, which had been dispatched there to call the attention of the local citizens, as well as Dr. Sun's speech at the capital in regard to his railway scheme, had principally to do with the summoning of this sudden meeting. The idea of connecting the two cities in question with a railway line is no novel one. Three years ago, some prominent people of Tengchow, Laichow and Chefoo got together and organized a limited partnership under the name of the Chefoo-Weihsien Railway Co. A plan was drawn up, the estimate was made out, and the work was about to be started. The scheme, however, remained unexecuted owing to the lack of necessary funds, through the unwillingness of shareholders to pay in their subscriptions. Whether or not the plan will take a tangible shape this time remains to be seen. The length of the railway is 660 *li* or nearly 330 kilometres, requiring a sum of $15,000,000 for its construction.

Toyama-Naoetsu Railway:—The Toyama-Naoetsu Railway which was to have been opened by the end of October, it is feared, will not be completed before next March, owing to the recent inundation which visited the regions. The Japanese Railway Board is now, however, concentrating its efforts upon the building of the railroad between Naoetsu and Itoigawa, which section received less damage than that of Itoigawa and Tomari. At the present rate of work it was expected that the railway between Itoigawa and Nadachi would be opened by November 3.

The Szechuen-Hankow Railway:—A Peking telegram dated September 23 states that the Szechuenese shareholders have agreed to the Central Government owning and constructing the Ichang-Kweichow section of the Szechuen-Hankow railway. The following are among the conditions agreed upon: (1) All the stations, houses, and materials for construction along the Ichang-Kweichow railway line will be turned over to the Government; (2) The funds left in the Szechuen Railway Co. will be used by the said Company for the development of other industries; (3) Should the Government see fit to choose another route than the one already decided upon, the Company will retain the right of constructing a line along the original route. The line constructed by the Company will be considered as a branch line to that constructed by the Government; (4) The Company will be responsible for all the liabilities thus far incurred.

Cebu Street Cars:—Mr. Martin M. Levering, according to the *Cablenews American* of September 24, received a cable from London capitalists agreeing to supply the money to equip the city of Cebu with an electrical street car system.

The bill for authorizing a street ear system in Cebu was brought betore the Philippines Assembly in 1910, but it was not until June 1911 that the franchise was granted to Senor Simplicio Rodis; at the time of the initiation of the scheme an English company had the money ready to organize a Cebu Car Company and to begin work, but the delay in getting the franchise through caused a temporary halt in the scheme as the English capitalists tired of waiting devoted the money to other propositions.

Six months ago, Mr. Martin M. Levering left for London to see what could be done to interest English capital in the matter and as a result of his work the plan has now been taken up by a group of capitalists who are putting three-quarters of a million pesos into the concern.

The chairman of the new company is Sir Frederic Fryer, former Lieut.-Governor of British Burma, and a member of the board of directors of the Rangoon tramways. Each member of the group is a man of financial prominence, and all are men who invest millions in each enterprise that appeals to them. Their advent into the commercial life of the Visayas is likely to prove one of the most important events in the commercial history of the Philippines.

S.M.R. Traffic Returns:—The South Manchuria Railway Traffic Returns for last September give Y.931,664, which is a decrease by Y.210,067 as against the corresponding period of last year. In the aggregate for the half-year from April, however, this year's increase over last year amounts to Y.588,412.

China's Provincial Railways:—The following circular, signed by H. B. M.'s Consul-General and issued to the British mercantile firms in Canton, is published in the Hongkong *Government Gazette* for general information:

"The undersigned is directed by His Majesty's Minister to inform British subjects that the Chinese Foreign Office have reaffirmed, in the case of provincial railways under commercial management, the principle laid down by the late Tsung-li Yamen, that loans contracted with foreigners are not valid unless they have been previously sanctioned by the Central Government."

Trang-Bangkok Railway,—It has been decided to open for traffic 90 kilometres (Trang Tong Song) of the Trang Division by the 1st December, 1912. At present only construction trains are running. Some, however, already take passengers and goods. The earnings are very encouraging. It is just three years ago since the work was started. Construction is being vigorously pushed on from half a dozen points between Petchaburi, Trang and Singora and the engineers are to be congratulated on the excellent progress made. By the time the line is through to Bangkok, the Trang Harbour and its approaches will have to be dredged, buoyed, and charted, so that the connecting mail steamers from Penang should have no difficulty in entering at all states of the tide.—*Siam Observer.*

The Kiangsi Railway.—Success is said to have crowned the efforts of the Far Eastern Industrial Promotion Company (To-a Kogyo Kaisha) which made repeated efforts to arrange a loan with the Kiangsi Railway and met invariably with failure. It is reported that the success is due to Mr. Kyohei Shiraiwa, director of the concern. The contract has been signed and terms are:

Amount	*Yen* 5,000,000
Rate of interest	6 per cent.
Redemption	10 years.
To remain unredeemed	16 years.

The company has paid £300,000 on account and Mr. Iyukuro Kadono, another director will, it is stated, visit Shanghai in order to turn over the rest ot the money, that is £4,700,000. Arrangements are further made that the railway shall settle all its liabilities with the Industrial Bank, the Okura Gumi, Mitsui Ginko and several Chinese banks, to the amount of some £2,000,000 and that the remaining sum shall be deposited with the company at 6 per cent.—*The Far East.*

South Manchuria Railway Shops.—Work on the railway shops at Dairen was commenced in 1908, and after the work on the buildings was well under way the railway company sent a special engineer to England to purchase the necessary materials for the 13 buildings, including machinery and fittings. These materials were brought in between May, 1910, and August, 1911, in 21 steamers. The total cost of completing these shops will run close to $2,250,000. They have a capacity for repairing 27 locomotives, 36 passenger cars, and 130 freight cars. In addition to the 9 cars constructed for the Manchuria-Korea through-express line and 3 sleepers for the main line mentioned above, these shops constructed 17 electric cars for the Dairen street railway. The machinery set up during the year included four 30-ton electric cranes and 11 cranes, electric and hand, of 1 to 15 tons. The installation of 40 other cranes was about completed at the end of the year.

Six locomotives, 1 motor inspection car, 3 first-class passenger and dining cars, 3 sleepers for through traffic use with the Korean Railway, 3 first-class passenger and baggage cars, and 3 baggage and mail cars were constructed in 1911.

Hunan-Canton-Hankow Railway

Work on the Changsha-Chuchou section of the Hankow-Canton Railway proceeded in the usual leisurely manner for the first four months of 1911. In May, however, when the Imperial Edict decreeing the nationalisation of the trunk lines was promulgated, the management, anxious to be able to point to some substantial achievement as an argument against the impending foreign loan, started carrying on the work with feverish activity night and day. The result was that, with the assistance of improvised trestle bridges, they were able to run a train, though with considerable difficulty, from Chuchou to Changsha on May 28, whereupon the line was declared open for traffic. A few days later, however, the embankment collapsed some 7 miles out of Changsha, other breakdowns subsequently occurring elsewhere, and traffic was not resumed until September 10. Since that date one passenger train has been running each way daily, but no goods traffic has so far been attracted. The passenger receipts were said to average $100 a day.

At the end of the year only three steel bridges had been erected out of the 40 or more required for this section; the remainder were still temporary trestle bridges. The line is very badly laid and is far from safe, and will certainly require to be rebuilt before being fit for fast and heavy traffic. For the 33 miles between Changsha and Chuchou, with only two intermediate stops, 2¼ hours have to be allowed, as a higher speed would be dangerous. To accomplish these results, as a native paper points out, nearly 5,000,000 Changsha taels (some £625,000) have been expended, including the cost of the rolling-stock (4 locomotives, 12 passenger cars and 20 freight cars); and, as stated above, the receipts total some $100 a day.

No orders of any importance were given to foreign firms during the year, except for a railway work-shop at Changsha. The total cost came to about 12,000 Changsha taels (some £1,570). About one-third of this order went to a German firm; the balance was made up of second-hand machinery purchased in Shanghai. I am informed by an engineer who has inspected the work-shop that there is very little to show for the money expended and that the machinery is of an inferior description.

The railway has been connected at the Chuchou end with the line from P'ing-hsiang, so that the coal from the mines might be carried by rail instead of by boat as far as Changsha; but so far these hopes have not been realised, presumably owing to the bad construction of the line and to the lack of shipping facilities at this end.—(C. R.)

INDUSTRIAL

Cotton Mills in Japan

Considerable activity was shown toward the close of 1911 in the formation of new cotton-spinning companies and the extension of old ones, fostered by the low price of yarn, and it seems likely that 1912 will see more or less of a boom in the industry. Among the new companies in course of formation are the Hitaka Spinning Co., in Wakayama Prefecture, with a capital of $500,000, to supply yarn for the weaving of cotton flannel, and the Naniwa Spinning Co., of Osaka, capital $500,000, whose purpose is the manufacture of towels and knitted goods. The Mitsui Bussan Co., is also reported to be promoting a large weaving and spinning company at Osaka. Several other companies are reported as about to be formed more especially to engage in the manufacture of knitted goods and hosiery for the Chinese market.

The total number of spindles of new companies nnd the increase in the number of existing companies is about 180,000, while the new capital to be invested is about $10,000,000. The old companies, with the number of spindles to be added by each, are the Kanegafuchi, 30,000; Tokyo Spinning Co., 10,000; Godo 20,000; and Fukushima, 20,000. The new, companies, with the number of spindles run by each, include the weaving company of the Mitsui, 20,000; Knitted Goods Spinning Co., 10,009; spinning company of Mr. Taniguchi and others, 20,000; Hitaka Spinning Co., 10,000; Terada Spinning Co., 10,000; Nyuzen Spinning Co., 10.000; and Naniwa Spinning Co., 10,000.

Japanese Cotton Mills in China—Source of Cotton Supply.—The fact that raw cotton is imported from China to Japan, whence it is exported back again in the form of yarn and piece goods, is interesting Japanese capitalists in establishing cotton mills in that country. This tendency may in time have a serious effect on the export of yarn to China. In Shanghai the Japan Cotton Spinning Co., of Osaka, is conducting a spinning mill with 18,000 spindles and the Naigai Wata Kaisha of Osaka one with 20,000 spindles, while the Mitsui Bussan Kaisha is running, in the name of a trust, the Shanghai Spinning Co., (a Chinese concern) with 60,000 spindles and 520 looms, and the Wuchang Spinning Co., (also a Chinese concern) with 90,000 spindles and 750 looms for weaving. It is said that the Mitsui Bussan Kaisha has under its control in China 220,320 spindles and 2,500 weaving looms.

The Japan Cotton Co., proposes to increase the spindles of the Shanghai mill by 10,000 and after a while by 10,000 more, while the Naigai Wata Kaisha also proposes to increase its spindles to 50,000. The Mitsui Bishi Co., which hitherto has been interested in cotton spinning in China only in a small way, has now succeeded in acquiring a Chinese cotton-spinning mill at Shanghai, named the Sing Hwa Mill, with 1,000 spindles

Electric Light, Power, and Tramway Enterprises in Kyushu.—The electric-light, power, and tramway enterprises had an unprecedented boom in this district in 1911, some 41 different electric projects, including 5 tramways, having been inaugurated in Kyushu and Okinawa-ken, of which 25 have begun work.

Eukuoka Prefecture in the northern central part of Kyushu leads in electric companies with 8 working and 5 in course of construction, Oita Prefecture has 5 working and 3 under construction, Nagasaki Prefecture 3 working and 2 under construction, Kagoshima 2 working and 3 under construction, Saga 2 working and 2 under construction, Miyazaki 3 working and 1 under construction, and Kumamoto and Okinawa each 1 working.

The island of Kyushu is well adapted to electric development, having many streams capable of being utilized for power, and extensive coal-mining areas with cheap fuel for steam power.

The Hakata Electric Light & Tramway Co., of Hakata in Fukuoka Prefecture, has been in operation a little more than one year and is quite successful, having declared a dividend of 12 per cent. for 1911, The Nagasaki Electric Lighting Co. has made some improvement in its plant and will enlarge it considerably to meet the increased demand for light and power, which the old plant is too small to supply. A dividend of 8 per cent. was declared for 1911.

THE CHINA STOCK & SHARE HANDBOOK, 1912

The scope of this publication has been considerably extended and it can now claim a place among the books of reference devoted to the Far East. For many years the lack of accurate information in regard to joint stock companies operating in this field has been felt but until Messrs. H. E. Morris and C. R. Macguire last year conceived the happy idea of compiling the *China Stock & Share Handbook*, no attempt had been made to present the statistics in a handy and convenient form. While the volume issued in 1911 found ready acceptance among the investing public, it did not fulfil the desires of the compilers and it was determined to make the issue for 1912 an improvement in every way. This ambition has been achieved.

The book is divided into sixteen sections, and an idea of its scope can be obtained by a glance at the headings. The sections comprise: Stock Exchanges, Banks and Financial Institutions, Rates of Exchange, Loans, etc., Docking and Engineering Companies, General Store Companies, Hotel Companies, Industrial Undertakings and Manufacturing Companies, Insurance Companies, Land and Building Companies, Loan and Mortgage Companies, Mining Companies, Plantation Companies, Shipping Companies, Spinning and Weaving Companies, Wharf and Godown Companies, and Tramways and Railways. The new rules adopted by the Shanghai Stock Exchange to safeguard the interests of the investing public are given in full in the first section, together with examples of the contract forms now in use amongst members of the Exchange.

Particular attention has been given to information relative to the rubber industry, and statistics are quoted showing the principal factors which rule prices, Great Britian's rubber plantation areas, etc., etc.

The China Stock & Share Handbook is printed at the office of the North China Daily News and Herald, Limited, and is sold at $3 nett.

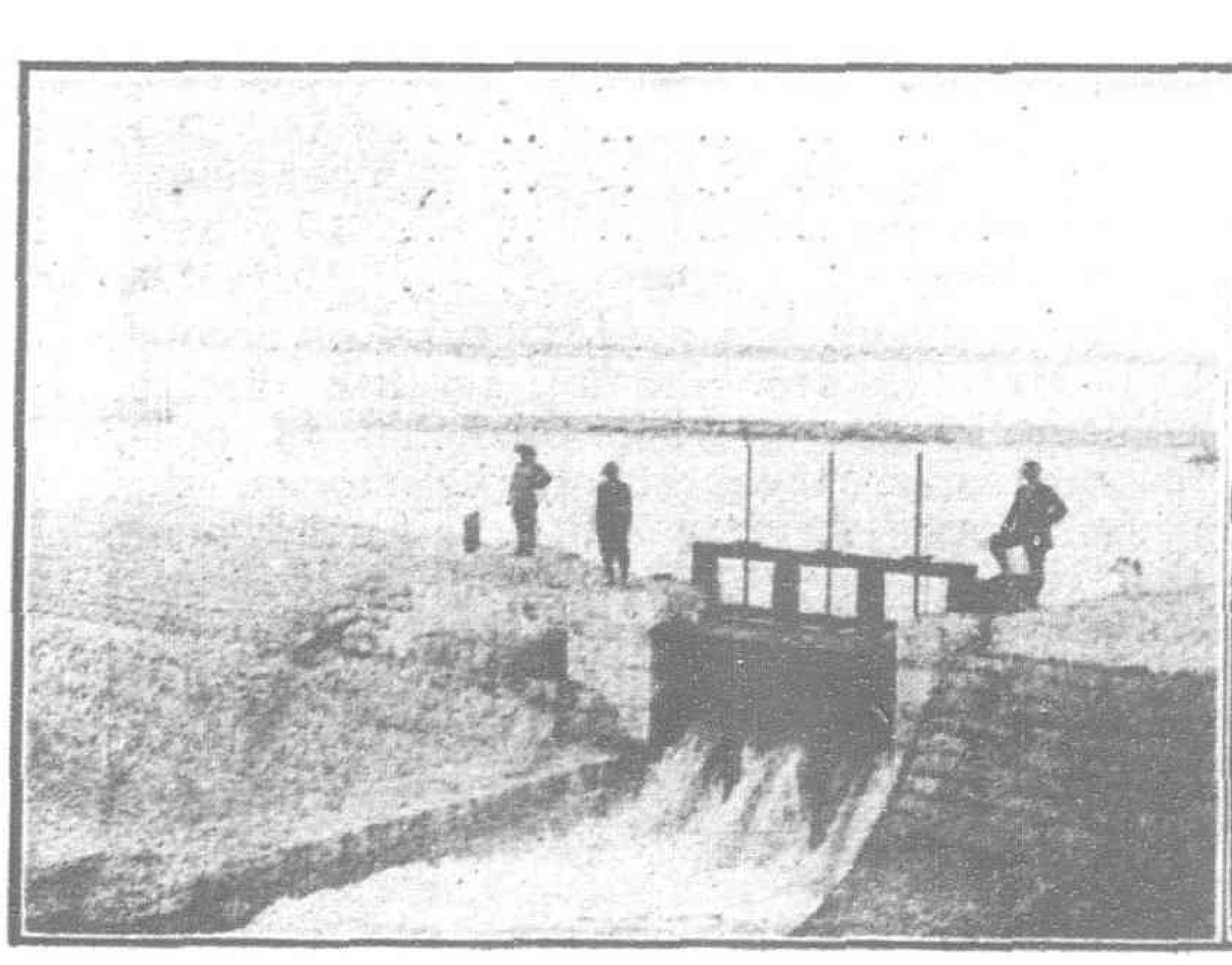
PROGRESS IN KOREA

KOREAN IRRIGATION SCHEMES

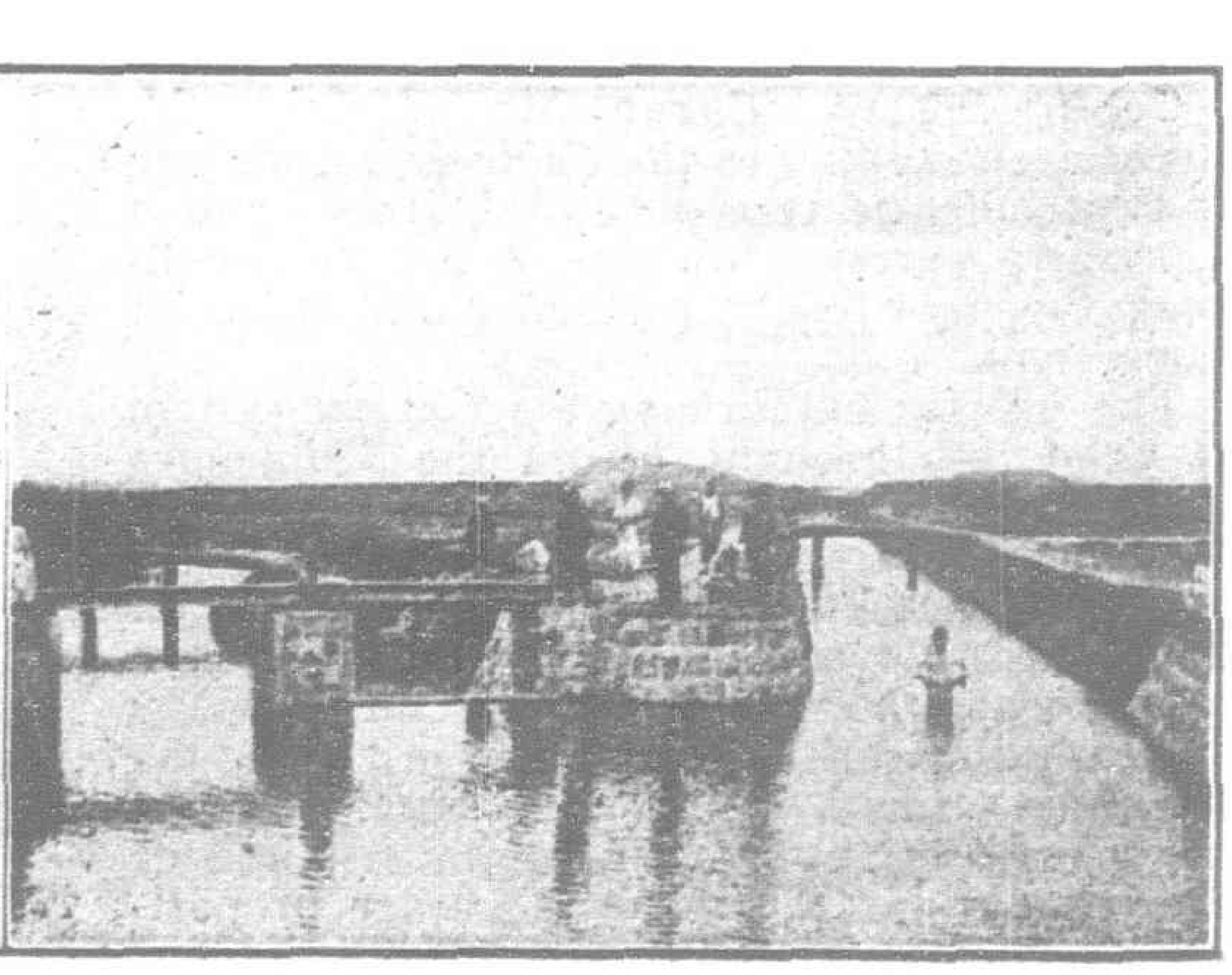
Agriculture being the principal occupation of the Korean people from remote ages, irrigation systems existed even in mediaeval times, so that barrages in rivers and irrigation reservoirs, thoroughly serviceable, were at one time provided in many places. These barrages and irrigating ponds were gradually neglected, however, until most of them were washed away or became deserted swamps. In July, 1908, an instruction was issued to all District Magistrates to investigate the existence and names of these irrigating barrages, dams or ponds, and about 4,000 have been reported. With the object of improving these water utilization measures, the Government caused those interested in irrigation in a district to form a so called water utilizing association, as far as circumstances permitted, by promulgating Regulations concerning Water Utilizing Associations in March 1906. Such Associations being authorized to levy from their members the necessary expense, labour contributions or articles, the construction or improvement of barrages or reservoirs, and their maintenance or protection are to be conducted by the association. Irrigation measures were of especially urgent necessity in the regions where the *Bankei* and *Toshin* rivers flow in North *Zenla* Province. These regions have vast tracts of paddy-fields, and in a year of drought, rice plantation often fails there over a wide expanse, as was the case in 1909 when more than 10,000 *cho* produced nothing. Consequently a detached office of the Model Farm at *Kunsan* was directed to carry out improvement of water utilizing measures in these regions. Meanwhile Water Utilizing Associations have been formed in several places.

A. Yokkuko Western Water Utilizing Association.—This association being the earliest organized in the Peninsula, its organic regulations obtained official approval in February 1909. Its irrigation district covers 277 *cho* of rice-fields in the *Kunsan* prefecture. The irrigation and draining are to be conducted by constructing river barrages and repairing old embankments.

B. Kinyeki Water Utilizing Association.—The organization of this association was officially approved in November 1909. The



THE FIRST BARRAGE



CANAL ROUTE

districts to be irrigated extended over *Yekisan*, *Rinpa* and *Kwanyetsu* in North *Zenla* province, and covered an aggregate area of paddy-fields measuring 3,000 *cho*. The irrigating water is to be taken by improving a reservoir called the *Yokyo* dam, covering an area of 810 *cho* and such that the dam can store a volume of water amounting to 600,000,000 *cubic shaku*, which serves to irrigate 3,000 *cho* of land. A loan amounting to 200,000 *yen* being raised, the construction work of the reservoir commenced in March 1910 and was completed in May 1911.

C. Mitsuyo Water Utilizing Association.—The regulations for forming this association were officially approved in April 1909. Its irrigation district covers 400 *cho* of paddy-fields and 233 *cho* of uplands located between the *Rakuto* (*Naktong*) and *Mitsuyo* (*Milyong*) rivers in the *Mitsuyo* district of South *Keisho* province. The principal object of this association is to irrigate the aforesaid lands by using canals connecting with these rivers in the dry season, and to prevent floods by improving the adjacent embankments.

D. Rensan Water Utilizing Association.—This association has to provide irrigation facilities for two areas, measuring 80 *cho* and 190 *cho* respectively, of waste land by improving a ruined reservoir and constructing small canals. The juridical existence of the association was officially recognized in April 1909, and the civil engineering work was commenced in June 1909 and completed by July 1911.

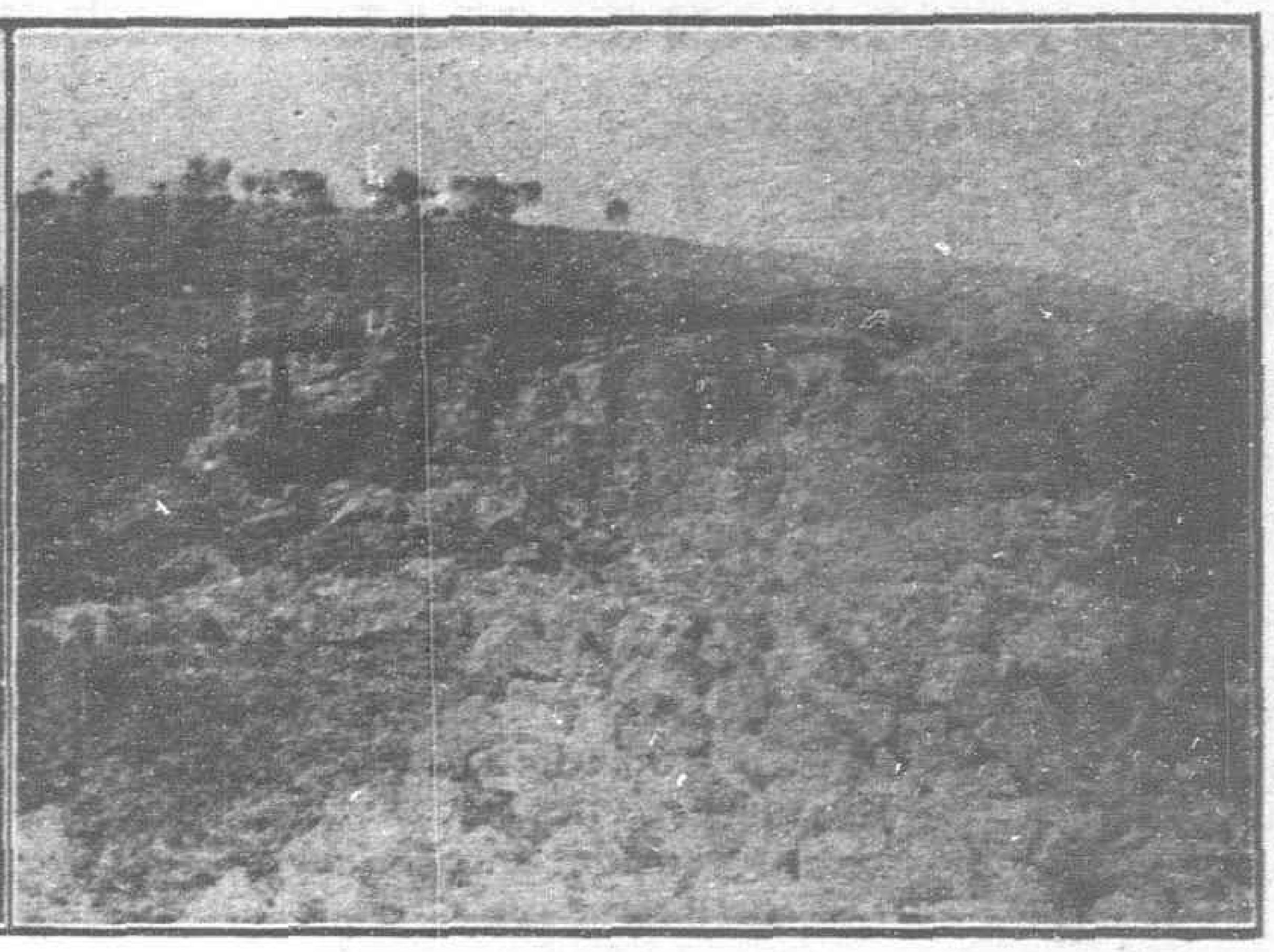
E. Zenyeki Water Utilizing Association.—Its juridical existence was approved in March 1910, and the irrigation district covers about 1,0c0 *cho* of land contiguous to the *Zenshu* and *Yekisan* districts of North *Zenla* province.

F. South Rinyeki Water Utilizing Association.—This association has to irrigate about 2,400 *cho* of a vast tract of cultivated land lying in the *Yekisan* and *Rinpa* districts of North *Zenla* province by taking water from the upper reaches of the *Bankei* river.

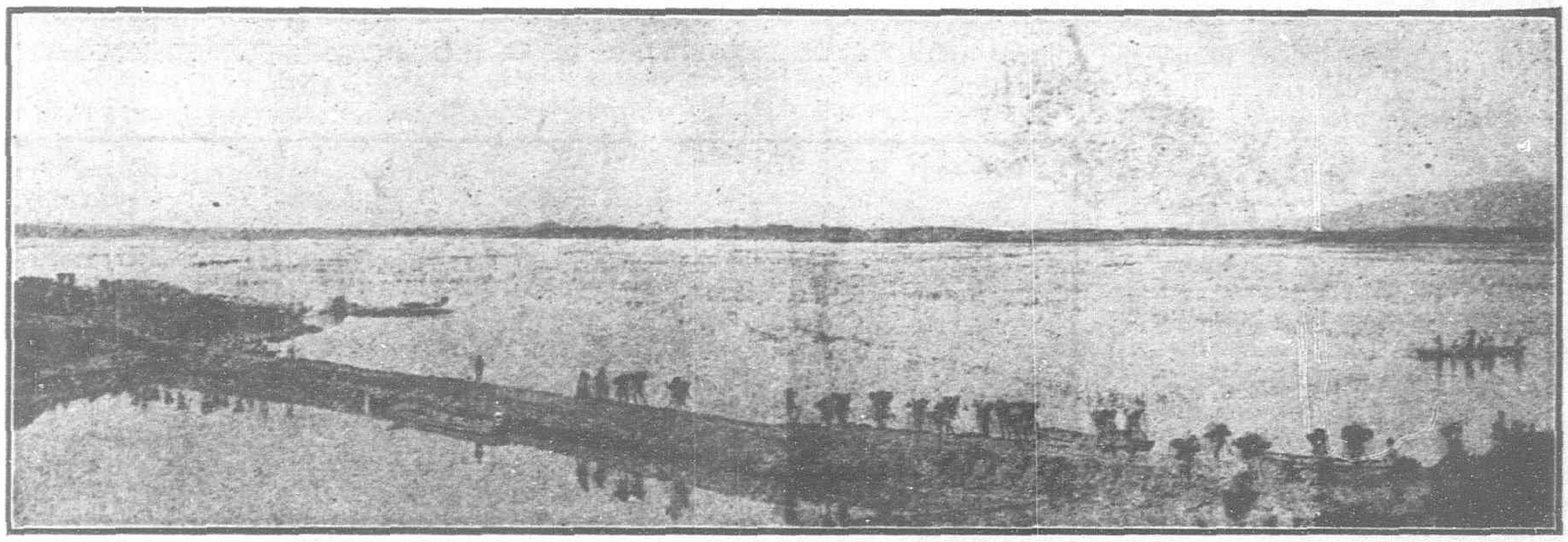
In addition, the *Rinyeki* Water Utilizing Association is planning to provide irrigation facilities for 4,000 *cho* of land contiguous to the *Rinpa* district and *Kunsan* Prefecture by building a bank along the left coast of the *Kinko* river in order to preveut the invasion of salt water, and by bringing river-water from the upper stream.

Another association also, called the *Toshinko* Water Utilizing Association, is planning to irrigate about 4,000 *cho* of the cultivated lands lying between the *Kintei* and *Bankei* districts by obtaining water from the *Toshin* river. For these water utilizing associations, the Agricultural and Industrial Banks are providing funds as circumstances permit.

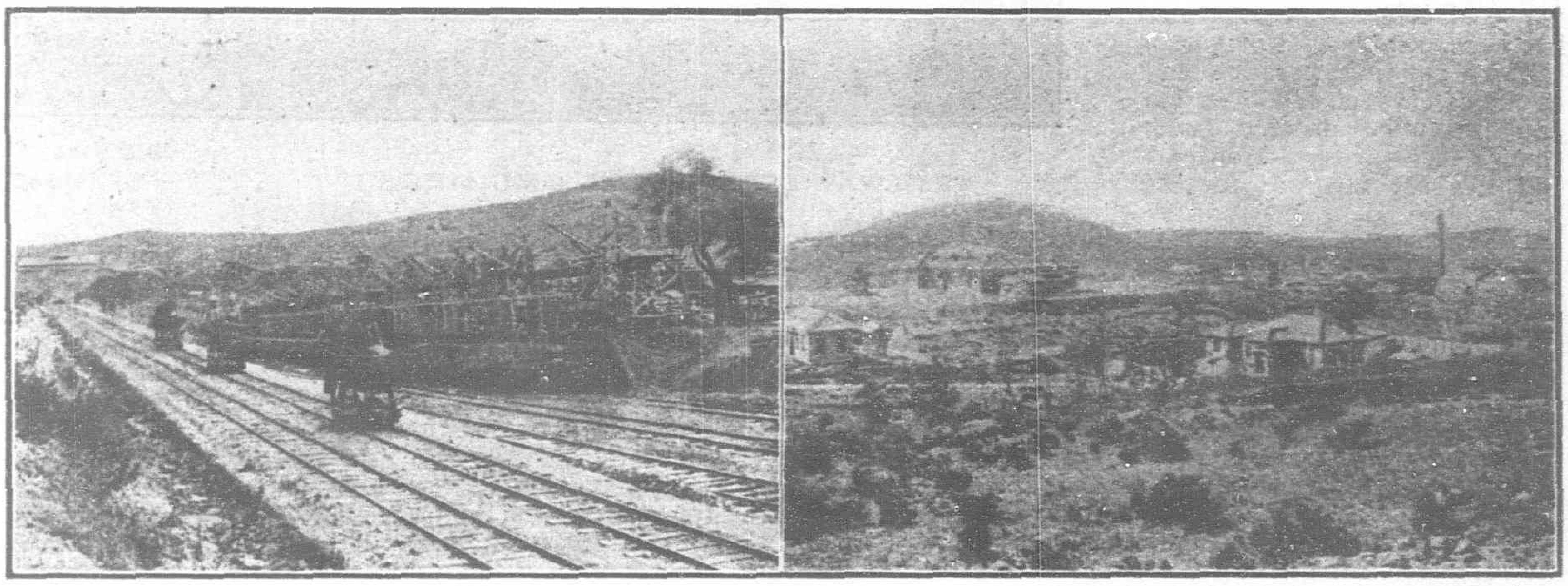
DRAIN PIPE ROUTE CONSTRUCTED WITH WOODEN TUBES BY SYPHON PROCESS



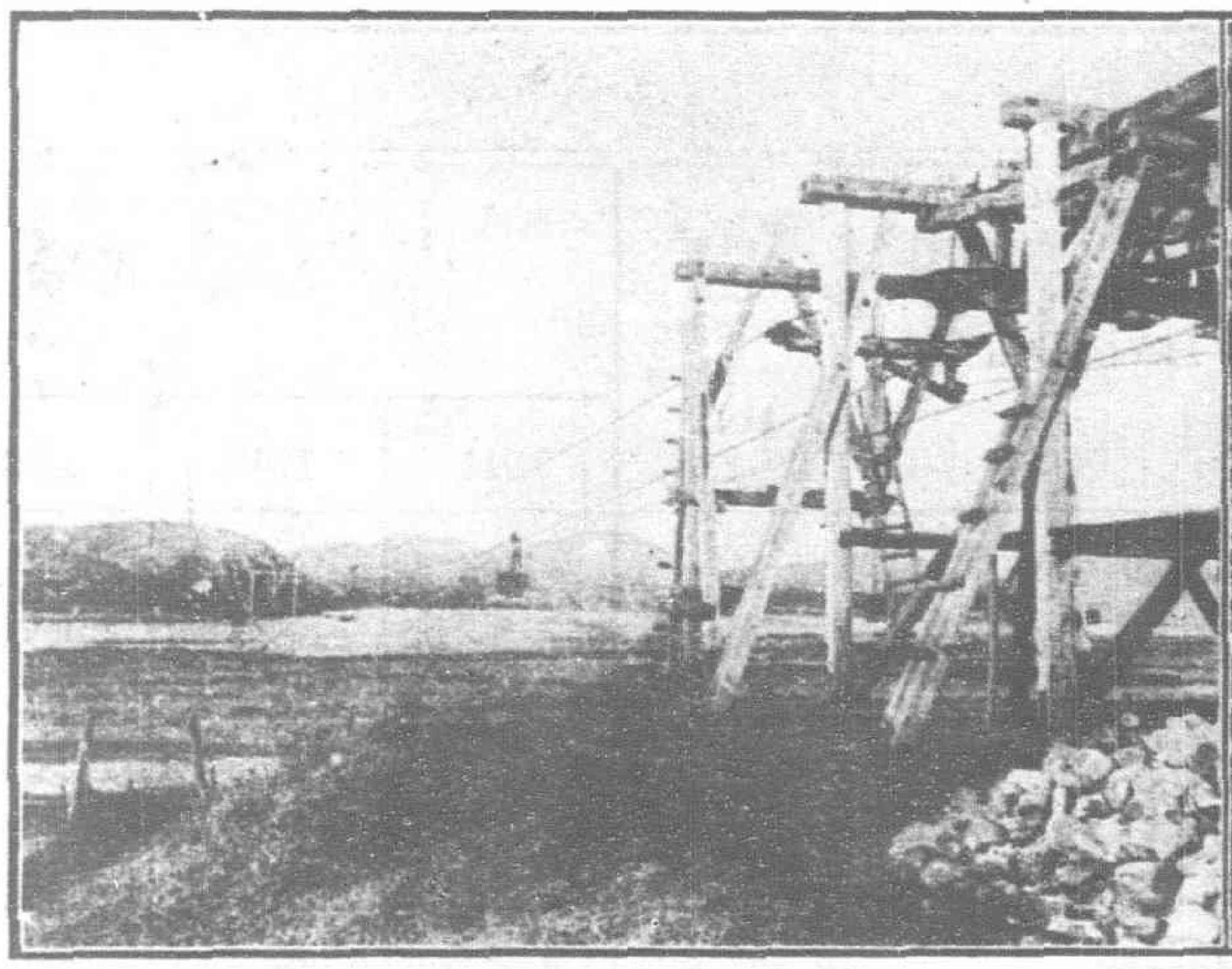
STONE QUARRYING FOR RESERVOIR CONSTRUCTION



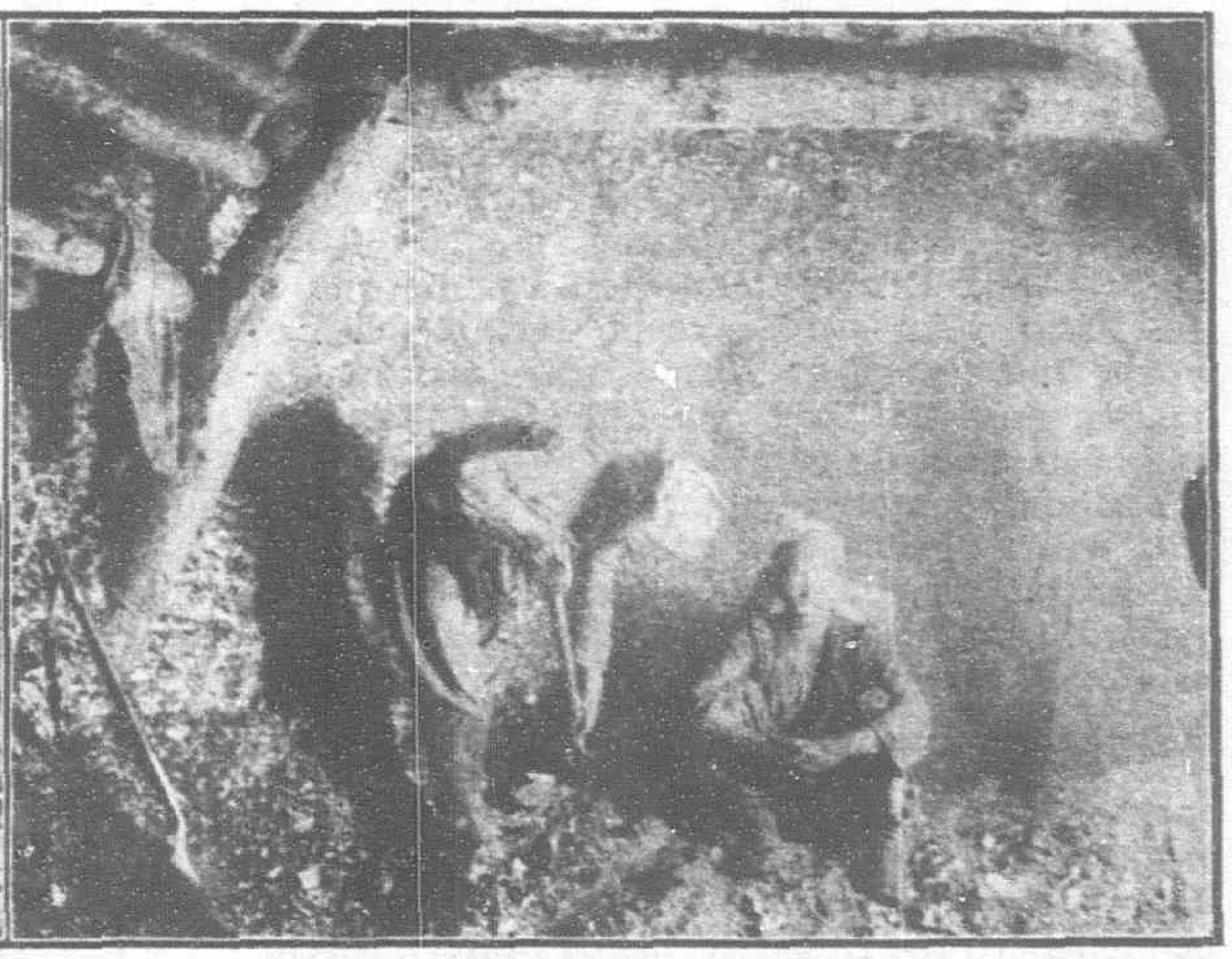
THE TOKYO RESERVOIR MAINTAINED BY THE RINYEKI WATER UTILIZING ASSOCIATION



KOREAN GOVERNMENT COAL MINING STATION AT JIDO, NEAR HEIJO



AERIAL TRAMWAY AT COAL MINES



KOREAN MINERS

HEIJO (PYING-YANG) COAL MINES

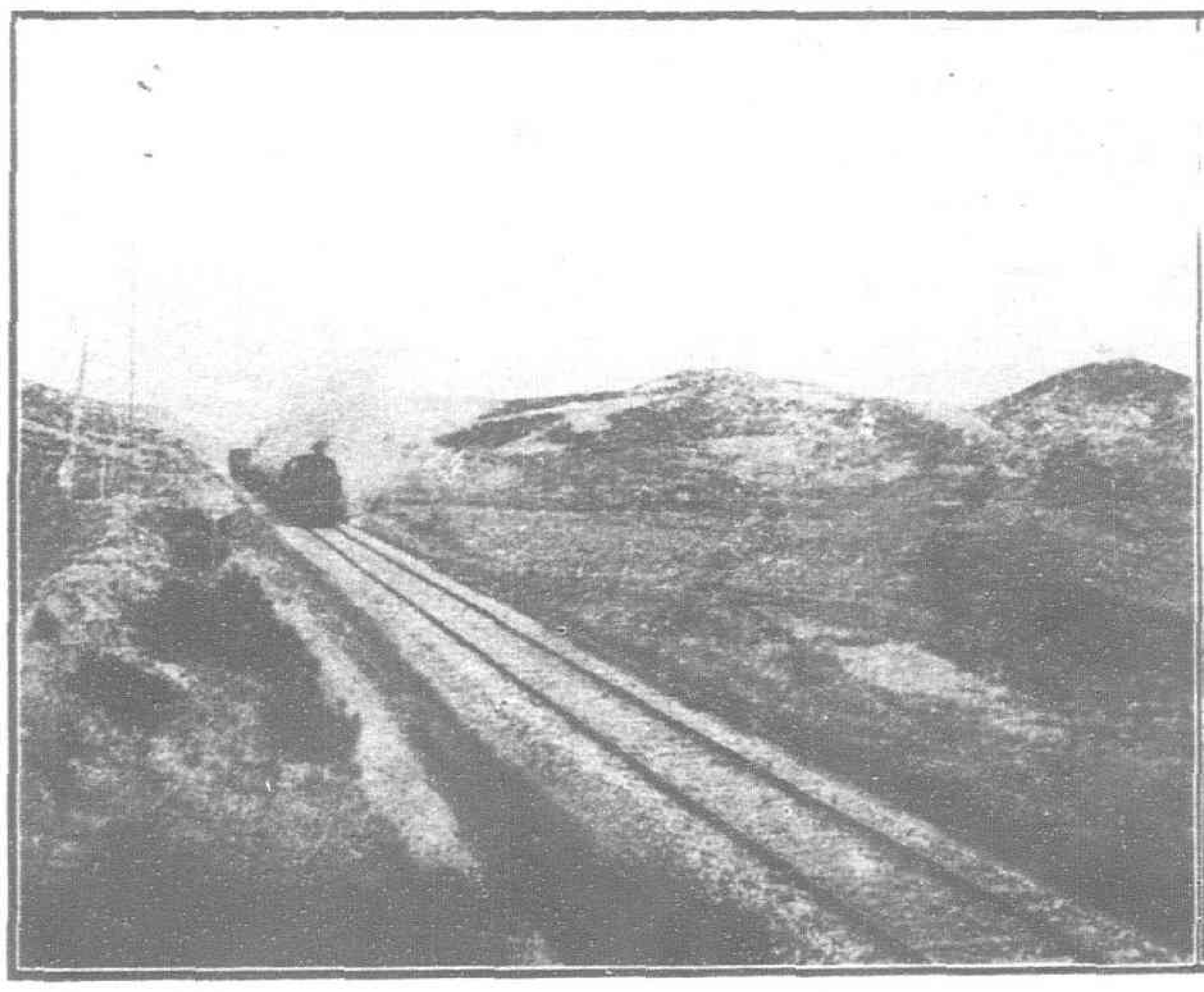
(KOREA)

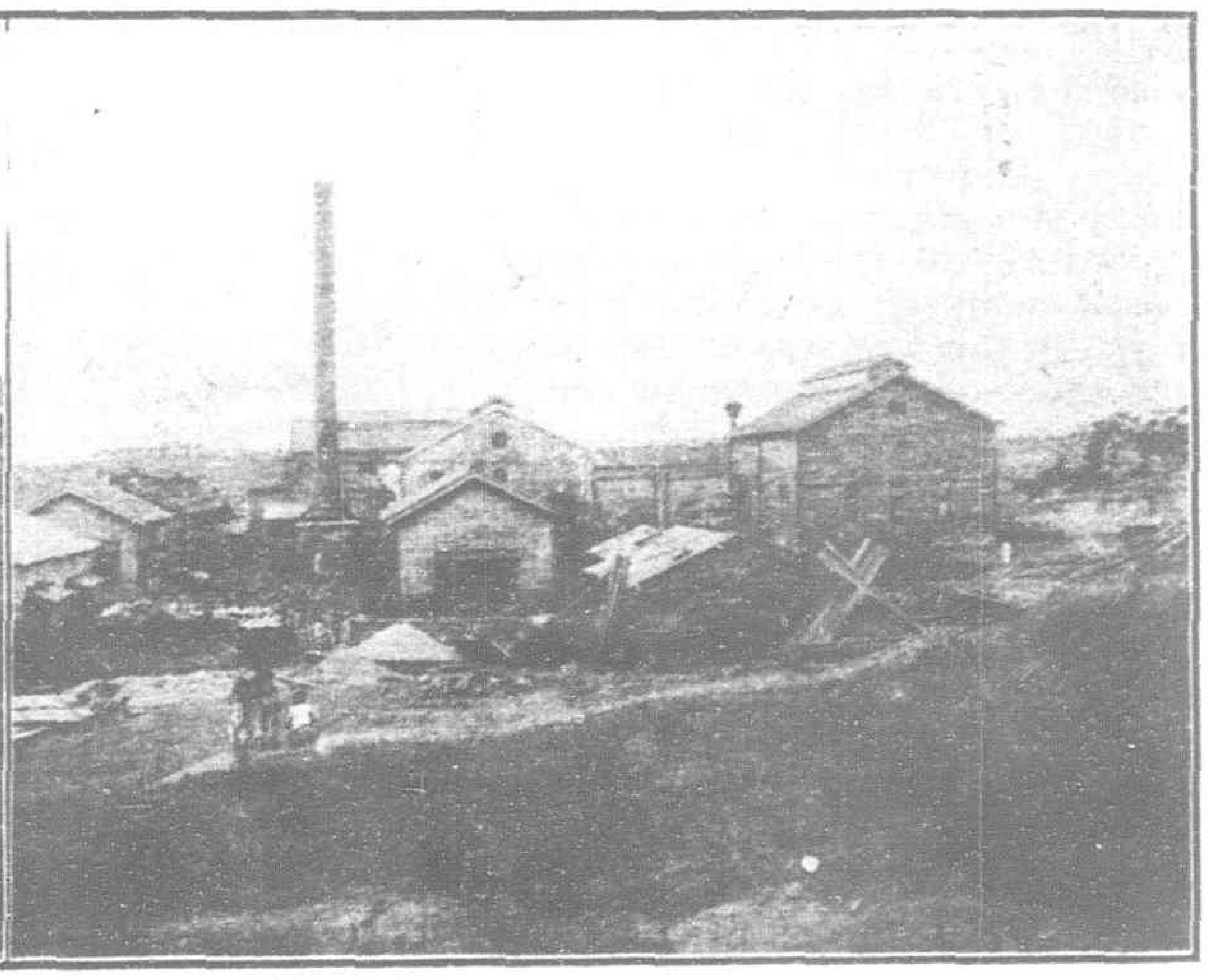
Along the main-stream of the *Daido* (*Taidong*) River and its tributaries, in the neighbourhood of *Heijo*, beds of powdered anthracite coal are found extensively, the veins being about 13 *ri* (32 miles) in length and 3 *ri* (7½ miles) in width. Their position forms the letter Y. Such being the general feature of the mine, its products should be rich. With a view to augmenting the State revenue as well as affording a livelihood for the people around the coal districts, the Resident-General caused the Korean Government to undertake coal mining, and the *Heijo* (*Pying-yang*) Coal Mining Station being established in 1907, the digging out of coal, the making of coal briquets and the sale of these products were conducted by this station under the control of the Department of Agriculture, Commerce and Industry of the late Korean Government. In the sequel of Annexation, the Coal Mining Station was brought, in October, 1910, under the control of the Government-General and its organization was somewhat changed. The Vice-President hitherto employed at the station being abolished, the staff now consists of the President, a permanent Secretary, two permanent Technical Experts and eight Clerks and Subordinate Experts.

The extension of this coal mining which was commenced in 1908 at an expense of 150,000 *yen*, as a first stage, was completed in 1910. Improved boiling machines and diamond drills, winding engines, etc., being set up, the producing capacity has been considerably increased. A modern machine for coal briquets manufacture has been installed. Further, a railway running 7 miles and 12 chains between *Heijo* station and the mine districts being completed, better transport facilities are afforded for the sale of coal and coal briquets. Should another extension, planned as a second stage at an estimated cost of 760,000 *yen* which was commenced in 1911, be completed, more than 100,000 tons of coal per annum will be obtained at much less expense.

During the year 1910 and the three months ended in March 1911, over 100,000 tons were taken out. The contract for supplying *Heijo* (*Pying-yang*) anthracite coal to the *Tokuyama* Coal Briquet Manufacturing Station of the Japanese Navy still being continued, 46,865 tons of coal out of the total output was furnished to the *Tokuyama* Station during the year 1910. The general condition of the business operations conducted by the *Heijo* (*Pying-yang*) Coal Mining Station, as compared with the preceding year, is as follows:—

Year	Amount of coal taken out	Amount of coal sold	Price received for sale	Expenses of mining operations and of extension works	Number of Employees engaged by the day
	ton	*ton*	*yen*	*yen*	
1910..................	100,173	99,466	761,045	1,246,182	291,185
1909..................	53,493	47,218	219,422	355,551	163,432
Increase (+) or.......... Decrease (−)	+ 46,680	+ 52,248	+ 541,623	+ 890,631	+ 127,753


RAILWAY EXTENSION TO COAL MINES


COAL BRICQUET FACTORY

KOREAN HARBOUR IMPROVEMENT WORKS

With the object of improving customs facilities and harbours at open ports, reclamations or dredgings, constructing office buildings or go-downs of customs houses, and other engineering works were commenced, soon after the establishment of the Japanese Protectorate in the Peninsula. A fund of 3,644,546 *yen* apportioned for these enterprises, which were to be carried out during five years from 1906, was subsequently increased to 4,900,830 *yen* as the original plans for the five years' consecutive works were modified to eight years. These improvement works in 11 sea-ports and 3 interior cities along railways—*Jinsen*, *Fusan*, *Gensan*, *Kunsan*, *Mokpo*, *Chinnampo*, *Seishin*, *Joshin*, *Masan*, *Shingishu*, *Keijo*, *Heijo* and *Taiko*—were nearly completed by the end of the fiscal year 1910, except certain parts of works unfinished in *Jinsen*, *Fusan* and *Chinnampo*, and 3,817,022 *yen* out of 4,951,823 *yen* had been spent up to March 31, 1911.

The above improvement of customs facilities and work of harbour construction have been conducted as the first stage. But with the gradual growth of foreign trade in the Peninsula and the development of the railway system, further extensions of harbour improvements in *Fusan*, *Jinsen*, *Chinnampo* and *Heijo*, such as may offer adopting the system prevailing in China, was conducted by establishing a Board of Commissioners in 1885 independently of the Departments of State, a foreigner being appointed Chief Commissioner. Then the Japanese Protectorate in the Peninsula having been established, a Japanese Financial Adviser was appointed in November 1906, to succeed the Chief Commissioner of the Korean Imperial Customs Board. Hitherto the Customs Board had principally discharged the duty of collecting customs duties, but now reforms in customs administration having been inaugurated, the functions of the Board were extended to promoting transportation and light-house facilities. Moreover, for the purpose of maintaining uniformity in the State revenue, the customs receipts, which had previously been treated as an independent account, were transferred to the general budget from the fiscal year 1907, like ordinary taxes, and when the Government Departments were reorganized in 1908, the Customs Bureau was established in the Finance Department. The Director of the Bureau has charge of all customs administration, as well as facilities of ports and harbours, under the control of the Minister of Finance. Local customs' administration is conducted by four Customs Houses in *Jinsen*, *Fusan*, *Gensan* and *Chinnampo*; and by 6 Customs Branch Offices in *Kunsan*, *Mokpo*, *Masampo*, *Singishu*, *Joshin* and *Seishin*, all of which engage in collecting customs dues, inspecting harbours and ports and other matters concerning foreign commerce. Also Customs Guard Inspecting Stations were established in *Ulsan*,

Decription	Total amount of estimate for each port	Amount defrayed in consecutive years					
		1911	**1912**	**1913**	**1914**	**1915**	**1916**
	Yen	*Yen*	*Yen*	*Yen*	*Yen*	*Yen*	*Yen*
Fusan............	3,824,060	902,845	1,090,125	857,220	973,870	—	—
Jinsen............	3,483,394	533,394	600,000	600,000	650,000	650,000	450,000
Chinnampo........	835,000	325,000	340,000	170,000	—	—	—
Heijo............	129,375	62,960	66,415	—	—	—	—
Totals..........	**8,271,828**	**1,824,199**	**2,096,540**	**1,627,220**	**1,623,870**	**650,000**	**450,000**

Toyei, Gishu and *Yuki*, in addition to 19 other places, and Customs Bonding Stations were organized in interior cities—*Keijo, Heijo, Taiko* and *Ryugampo*.

The jurisdictional district of a local Customs House was hitherto limited to the regions adjacent to an open port on the sea coast. But with the growth of railway transportation, foreign trade came to be directly conducted in certain interior cities, and therefore the whole Peninsula was divided into four jurisdictional customs districts by a decree of the Finance Department issued on January 1st, 1908. Since, March 1910, administration concerning shipping and navigation was brought under the charge of the Customs Houses.

After Annexation, all customs administration was placed under the control of the Governor-General, and was carried out by the Revenues Bureau of the Finance Department of the Government-General and by the local Customs Houses. The jurisdictional districts of Customs Houses determined by the ordinance issued by anchorage for three steamers of 4,500 tonnage can be provided at one time. As to the construction of this wet dock, ground extending from the present customs compound to *Shato* (island) along the sea coast of the settlement street up to the foot of the Japanese park is to be reclaimed, and in the middle of the reclaimed ground a wet dock covering 30,000 *tsubo* of water surface and having a minimum depth of 26 feet is to be built toward the direction of the north east. A lock on the double-gates system is to be built to a length of 440 feet and a width of 68 feet, so that it can maintain a depth of 32 feet at neap tide or 43 feet at spring tide. A navigable route to the open sea from the lock is to be dredged to a depth of 14 feet at ebb-tide, and a training wall running 4,200 feet which will keep the water level of flood tide is to be built at the east side of the navigable route. The harbour improvement work in *Jinsen* is to be crried out in six years consecutive work from the fiscal year 1911.

Chinnampo.—For improving customs facilities and harbour equipment in the port of *Chinnampo*, 1,143,482 *yen* was apportioned as the first stage, out of which about 488,582 *yen* spent up to the end of the fiscal year 1910. The railway between *Heijo* and *Chinnampo* now being operated, the necessity of connection between land and wgter traffic in this port has been keenly felt, so that the original plan of harbour improvement has to be enlarged. Consequently, 180,000 *yen* being added to the balance of the originally apportioned fnnd (655,000 *yen*), that total—amounting to 835,000 *yen*—was designated for the furthur extension of *Chinnampo* harbour as the second stage of harbour improvement. In addition to the wet dock which was constructed in the first stage, an extensive landing basin of concave form is to be built by reclaiming a space of 2,600 *tsubo* on the east coast of *Hippa* island, and in order to connect the railway and the harbour space between the railway station and the harbour district covering 25,000 *tsubo* is to be reclaimed. A landing pier is also to be built at the extreme point of the landing basin. These harbour extension works in *Chinnampo* are to be completed in the two consecutive years beginning from the fiscal year 1911.

Heijo.—Although land traffic between *Heijo* and *Chinnampo* is maintained by a railway, the water traffic between these places in largely carried out by junks along the *Daido* (*Taitong*) river. In order to make this transport easier, the so called *Unan* shoal is to be dredged to 4½ feet depth with a width of 240 feet; a landing pier running up-stream from the customs office compound full facilities for connecting land and water traffic, were planned as the second stage after Annexation. This extension programme, which was approved in the 27th session of the Imperial Diet, was to be carried out in 6 years' consecutive work from the fiscal year 1911, at an estimate of 8,271,829 *yen* as shown in the following table on page 231:—

Fusan.—For the improvement of customs house compounds and the harbour in the port of *Fusan*, 1,143,482 *yen* was spent in the first stage; and a large wharf for ocean steamers (of 3,000 tons) connecting with the railway, was built. However, *Fusan* becoming, on the completion of the *Antung-Mukden* line, the terminal of a world route, the extension of the harbour on a large scale was urgently needed. Consequently, in the second stage of harbour improvement, dredging to a depth of 38 feet at the deepest point; constructing a second wharf with an iron pier provided for ocean steamers from 3,000 tonnage to 20,000 tons; extension of landing facilities so as to connect with railways and wharves; and extension of a breakwater with a double line of stone embankments from *Soryo* in the direction of *Fusanchin* so as to constitute a basin of 16,000 *tsubo* for the safe anchoring of small steamers and junks, are to be carried out during four years from the fiscal year, 1911, at a cost of 3,824,060 *yen*.

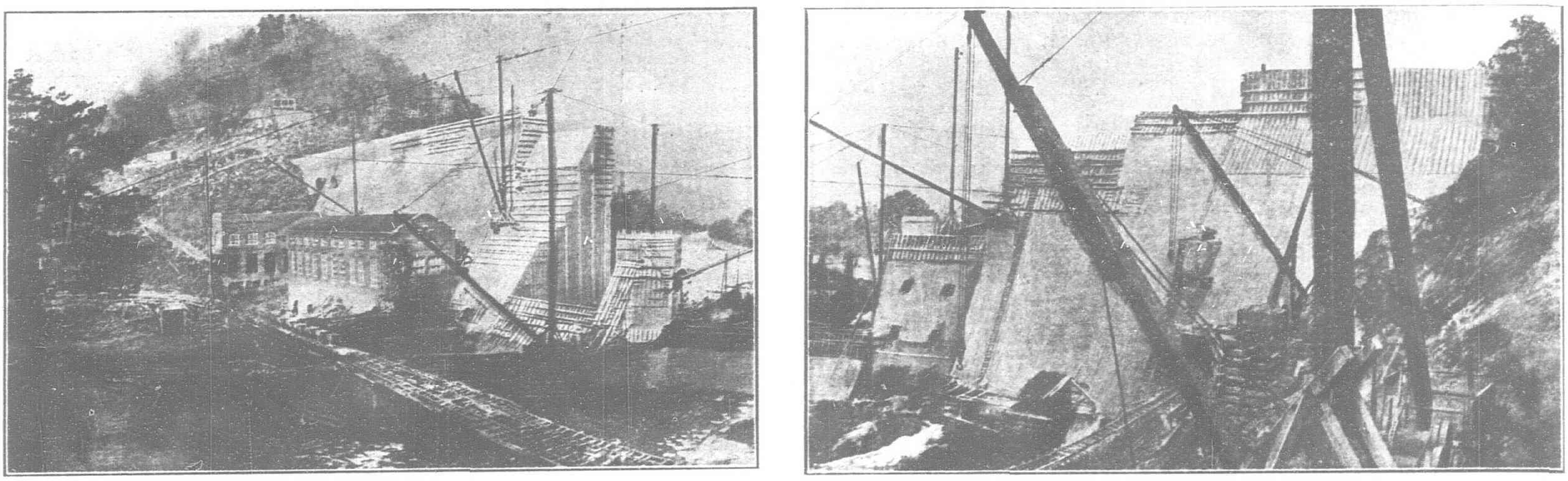
Jinsen.—For reconstructing the customs houses compound by reclaiming a lot measuring 17,978 *tsubo* and constructing office buildings, landing piers, ware-houses, etc., and for extending the railway, to the harbour, over 900,000 *yen* was spent in the first stage up to the end of 1910. This port is still important, as it leads the other ports in foreign trade. The second stage of extension, which will cost 1,483,394 *yen*, consists, chiefly of engineering work in the shape of harbour reconstruction, providing a wet dock system, as the mouth of the harbour is constantly silted up by the sand of the *Kan* (*Han*) river. This wet dock is to be built so that is to be reclaimed with a stone wall; and the navigable route between the customs office compound to *Unan* shoal is to be dredged to the depth of six feet at ebb-tide. A railway running about one mile is to be extended from the station to the customs office compound.

ELECTRICAL PROGRESS IN KOREA

Business relating to electricity in the Korean Peninsula was originally supervised by the Japanese Local Residencies and the Home Department of the Korean Government. After Annexation, this supervision was transferred to the charge of the Communication Bureau. But there were no regulations for supervising business of this kind. By the Company Regulations promulgated in November, 1910, persons desiring to undertake electric work by organizing a corporation, should apply in accordance with this law. Since, however, the supervision of electric enterprises require special regulations, a body of Regulations for the Control of Electric Business was promulgated by Ordinance No. 24 of the Government-General issued in March, 1911, by which persons desiring to undertake electric business should apply to the Governor-General for permission; and which also provided for preventive measures against possible danger. Up to the end of the fiscal year 1910, the permissions given to applicants were 10 cases in all, and among these three have already opened the rest not having yet commenced. The following table shows details:—

	Name of Proprietor	Date, Permission given	Object of Business	Places where Electricity is Supplied	Capital		Business Expense	Income	Profit
					Authorized	Paid			
					yen	*yen*	*yen*	*yen*	*yen*
Companies that have opened business	Japanese Korean Gas Electric Co.	Jan., 1898	Electric Light, Electric Power, and Electric car	*Keijo*	3,000,000	2,400,000	182,389	287,143	104,753
	Jinsen Electric Co.	April, 1906	Electric Light and Electric Power	*Jinsen*	150,000	150,000	21,703	29,733	8,030
	Korean Gas and Electric Co.	......	Electric Light, Electric Power, Electric car	*Fusan*	3,000,000	750,000	28,074	46,178	18,104
Companies that have not yet opened business	*Chinnampo* Electric Co.	Aug., 1910	Electric Light and Electric Power	*Chinnampo*	150,000	25,500	....	....	....
	Branch office of Japanese Korean Gas and Electric Co.	June, 1910	Electric Light and Electric Power	*Masan*	100,000	100,000	....	....	....
	Taiden Electric Co.	Jan., 1911	Electric Light and Electric Power	*Taiden*	80,000	....	....	....	....
	Heijo Electric Co.	Jan., 1911	Electric Light and Electric Power	*Heijo*	300,000	....	....	....	....
	Yoshitake and 21 other persons	Jan., 1911	Electric Light and Electric Power	*Taiko*	100,000	....	....	....	....
	Ota and 4 other persons	July, 1907	Electric Light and Electric Power	*Gensan*	100,000	....	....	....	....
	Shibusawa and 9 other persons	June, 1906	Electric Light and Electric Power	*Roryo-sin—Yeitoho*	1,350,000	....	....	....	....

THE POWER OF OCOEE



THE DAM AFTER SEVEN MONTHS, THE PERIOD OF STREAM SIDE. GREATEST ACTIVITY. VIEW FROM DOWN POWER HOUSE AND
DAM PARTIALLY COMPLETE TRANSFORMER HOUSE TO THE LEFT

The evolution of *industrial civilization* has been accomplished largely at the expense of *nature's resources.* The development of the one has meant the inevitable loss of the other. Water alone furnishes a permanent supply of power; all other agencies are destroyed in their using. The use of water for power means the *conservation of fuel* and must eventually replace it in the industrial world.

Power now produced in America from all sources—coal, water, gas and oil—is estimated by the United States Bureau of Corporations at 30,000,000 horse-power, of which 6,000,000 horse-power is developed from water, effecting a saving of at least 33,000,000 tons of coal each year. The water power economically available for development is approximately 25,000,000 horse-power, the complete utilization of which would reduce to a minimum the consumption of our destructible resources and indefinitely postpone the day of their exhaustion.

It is through the development of *electric transmission* that water has, within a very short time, become one of the great factors in the production of power. Once confined to the locality in which it was produced, hydro-electric power can now be distributed over an area of at least 100,000 square miles; thus bringing it within the reach of established industrial centers and making it more and more formidable as a commercial competitor of coal.

The permanent character of the power supply encourages the designer of hydro-electric plants to build for all time. Thus these great masonry structures, together with their power houses and machinery, have come to be regarded as the greatest accomplishment of modern engineering skill and efficiency. The highly specialized knowledge and the financial resources necessary to make such developments possible have limited the number of firms capable of undertaking work of this character.

The installation of the Eastern Tennessee Power Company on the Ocoee River at Parksville, Tennessee, with its 38,000 horse-power ultimate capacity and a distributing range of over 100 miles in every direction, takes its place among the great water power developments of the country.

Constructed in record time, incorporating many features novel in their engineering significance and designed for permanency as well as operating efficiency, the Ocoee development becomes an enduring monument to its builders.

THE STORY OF OCOEE

Rising in the mountains of Northern Georgia, the Ocoee River flows through a region of heavy rainfall in a northwesterly direction to a point near Parksville, Tennessee, where it joins the Hiawassee; in its course draining an area of more than 600 square miles.

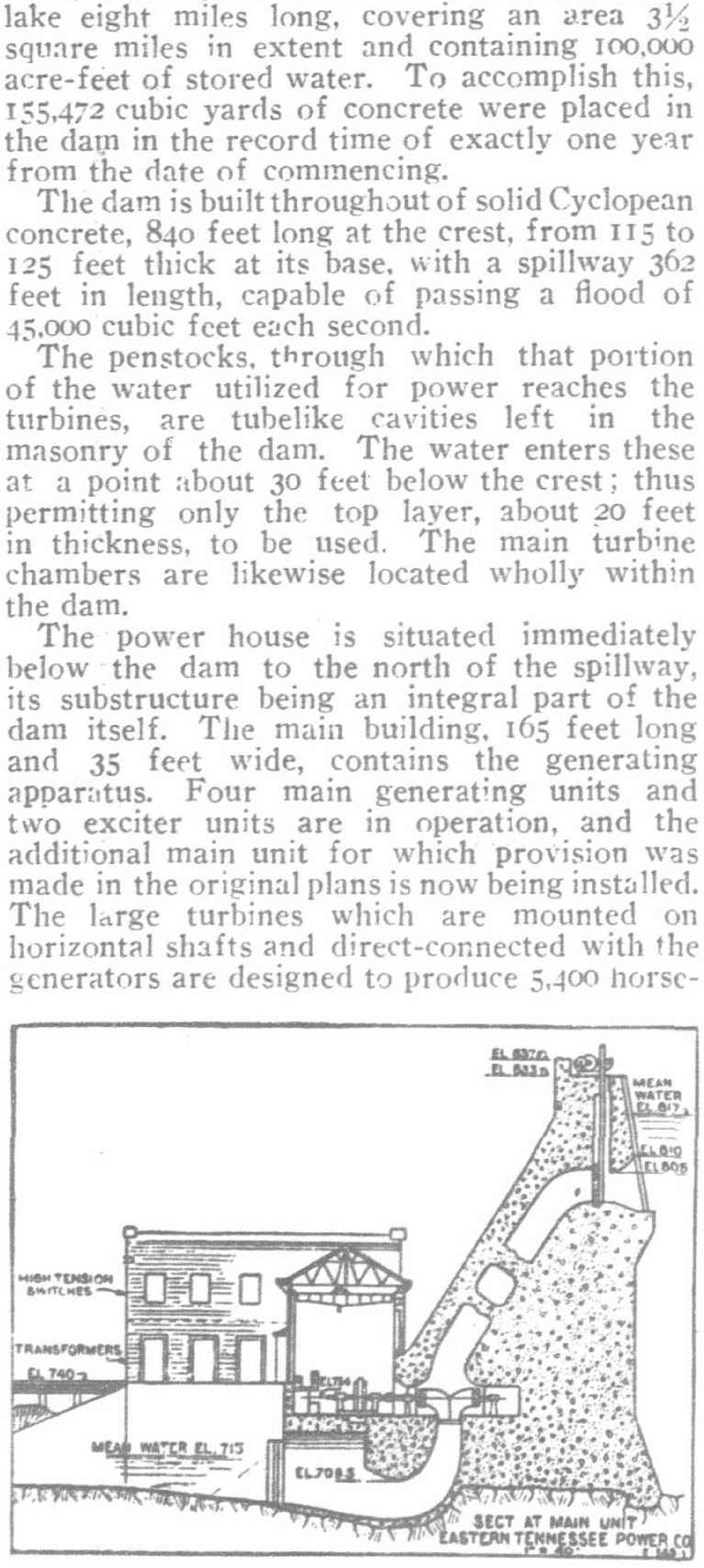
At Parksville the mountains have been cut by nature to form a deep and narrow gorge, above which the river flows for many miles through a broad and spacious basin—a location well suited to the purposes of water power development.

Where the valley is narrowest the great Ocoee Dam now stands, spanning a gap of more than 800 feet and filling the gorge to a height of 125 feet from the river bed. The river, held captive in the valley above, forms a lake eight miles long, covering an area 3½ square miles in extent and containing 100,000 acre-feet of stored water. To accomplish this, 155,472 cubic yards of concrete were placed in the dam in the record time of exactly one year from the date of commencing.

The dam is built throughout of solid Cyclopean concrete, 840 feet long at the crest, from 115 to 125 feet thick at its base, with a spillway 362 feet in length, capable of passing a flood of 45,000 cubic feet each second.

The penstocks, through which that portion of the water utilized for power reaches the turbines, are tubelike cavities left in the masonry of the dam. The water enters these at a point about 30 feet below the crest; thus permitting only the top layer, about 20 feet in thickness, to be used. The main turbine chambers are likewise located wholly within the dam.

The power house is situated immediately below the dam to the north of the spillway, its substructure being an integral part of the dam itself. The main building, 165 feet long and 35 feet wide, contains the generating apparatus. Four main generating units and two exciter units are in operation, and the additional main unit for which provision was made in the original plans is now being installed. The large turbines which are mounted on horizontal shafts and direct-connected with the generators are designed to produce 5,400 horse-power each when operating at the rate of 360 revolutions per minute under a pressure head of 98 feet. The generators, having a capacity of 3,000 kilowatts, are operated at a voltage of 2,300. In the wing to the north of the main building are housed the transformers and high tension apparatus. The transformers, four in number, which are oil insulated and water-cooled, increase the voltage from 2,300 to 66,000, at which the energy is carried over the transmission lines.



A SECTION THROUGH THE DAM AND POWER HOUSE AT MAIN UNIT

ADDITIONAL INSTALLATIONS

The development originally planned had not yet been completed when the demand for power warranted proceeding with the installation of the reserve power units.

Besides the fifth main unit for which the power house was designed, the future increase in the capacity of the Parksville plant has been provided for by building two openings into the dam, to which penstocks will be attached, leading to a power house on the Company's property about 400 feet below the dam. This development furnishing 11,000 additional horse-power will be operated only for secondary power during periods of excess run-off.

The Company owns the necessary lands and water rights for additional water powers on the Ocoee River which falls some 600 feet in the 25 miles of its course above Parksville. A partial development of the power available along this course is also under way.

At a point about 13 miles above the Parksville plant, a 30-foot timber crib diverting dam will be constructed, from which the water will be conducted through a flume to a power house 5 miles below the dam, where, with a head of 250 feet, 20,000 horse-power will be generated.

The development of the water powers of the Ocoee River will eventually produce 75,000 horse-power, thus opening an extensive section of the south to industrial development.

THE AVAILABLE POWER	H. P.
Total available power on Ocoee River ..	75,000
Total ultimate capacity of Parksville development	38,000
Capacity of turbines in Parksville power house	27,000
Capacity of secondary power development at Parksville	11,000
Capacity of second development on Ocoee River, now under construction	20,000

HOW THE WORK WAS DONE

Dam commenced February 1, 1911; finished February 1, 1912.

Between these dates 155,472 cubic yards of concrete was placed, working day shifts only.

The maximum ten-hour placement was 1,108 cubic yards.

The maximum monthly placement was 21,214 cubic yards.

THE IMPORTANCE OF CAREFUL PREPARATION.

August 7, 1910, preliminary work was begun.

A railroad six miles long connecting the dam site with the line of the Louisville Nashville Railroad was built to permit the importation of materials and supplies.

To expedite the beginning of actual work on the dam it was deemed advisable to commence work on the construction plant before the completion of the railroad.

A plant for the crushing of stone and the mixing of concrete, with a capacity of 1,000 cubic yards during each ten-hour working day, was in operation by February 1, 1911.

Dwellings for 1,200 people, office buildings, shops, storehouses, commissary and stables, were all erected during this period.

The camp consisted of three distinct divisions; the main camp on the north side of the river, the negro camp on the south side of the river, and the foreign laborers' camp about one-eighth of a mile to the west of the negro camp. With this arrangement there was very little intermingling of the various classes; and by operating the two laborers' camps independently, with a deputy sheriff in charge of each, order and discipline were maintained.

HOW THE CONCRETE WAS PLACED

With few exceptions, all materials were handled mechanically, and wherever possible with automatic devices.

From quarries in the mountainside just below the dam stone was loaded by steam shovels to the dump cars, hauled by donkey engines to the crusher plant, and there reduced to the required sizes of both stone and sand.

The materials thus supplied by one process were then carried by belt conveyors to the storage bins over the concrete mixers, into which they were fed by gravity.

The cement was supplied to the mixers in a similar manner, and the water from large storage tanks.

From the mixers the concrete was loaded into buckets having a capacity of two cubic yards, hauled on flat cars to the dam, hoisted by derricks and dumped between the wooden forms to the place of its destination.

By October, 1911, the power house had been completed and all the machinery installed.

THE TRANSMISSION LINES

The construction of the transmission lines was begun April 1, 1911, and on February 1, 1912, approximately 180 miles had been completed.

The power developed is transmitted at 66,000 volts over two 3-phase circuits, to Cleveland, Tennessee, a distance of 13 miles from the power house. At the switching station in Cleveland the lines separate and the current is carried over single circuit wood pole lines in three directions, 26 miles west to Chattanooga, Tennessee, 85 miles northeast to Knoxville, Tennessee, and 70 miles south to Rome, Georgia.

Special steel construction has been used wherever the lines cross railroads and rivers, or where for other reasons special strength is needed. On the Knoxville circuit the Tennessee River, which is navigable at this point, is crossed by means of an 1,800-foot span supported by steel towers 125 feet in height.

EASTERN TENNESSEE POWER COMPANY

The Eastern Tennessee Power Company was incorporated under the laws of Tennessee, July 16, 1910, for the specific purpose of constructing and operating hydraulic plants on the Ocoee River in Polk County, Tennessee, and with general power to improve and develop the water power of rivers and streams both navigable and unnavigable, and to sell electricity throughout the State. Arrangements have since been made for the sale of electric power in adjoining States.

MARKET

The company is selling electric current for light and power purposes, and has an abundant market for its product in Chattanooga, Cleveland and Knoxville, Tennessee; Rome, Georgia, and intermediate and adjacent points. Among the larger power users are the Chattanooga Railway & Light Company, the Cleveland Electric Light Company, a number of manufacturing plants in Chattanooga, Knoxville, Rome, Athens, and Cleveland, including numerous cotton and woolen mills.

The Ocoee development, including the transmission system, was designed and built by J. G. White & Company, Incorporated, of New York City.

The operation of the property is under the direct management of E. W. Clark & Company, Bankers, Philadelphia, and Hodenpyl, Hardy & Company, Bankers, New York City.

The Eastern Tennessee Power Company was originally financed by

Drexel & Company, Philadelphia
Hodenpyl, Hardy & Company, New York
E. W. Clark & Company, Philadelphia
J. G. White & Company, Inc., New York

A NEW ELECTRIC CENTRIFUGAL SUMP PUMP

To meet the demand for an automatically controlled pumping outfit, for draining basements, handling domestic sewage, pumping out bilges, etc., where the liquid collects in a sump, the Goulds Manufacturing Company, Seneca Falls, N. Y., have developed a new Centrifugal Sump Pump.

The outfit as shown by Fig. 1 consists of a vertical Electric Motor direct connected to a Goulds Single Side Suction Pump. The pump is connected to a cast iron pit cover, by a rigid pipe column. This cover also acts as a support for the motor pedestals. The shaft is enclosed by the column which connects the pump to the cover and is therefore, protected from the liquid in the pit. A cover plate on the flange which connects the pump and supporting column permits inspection of the stuffing box.

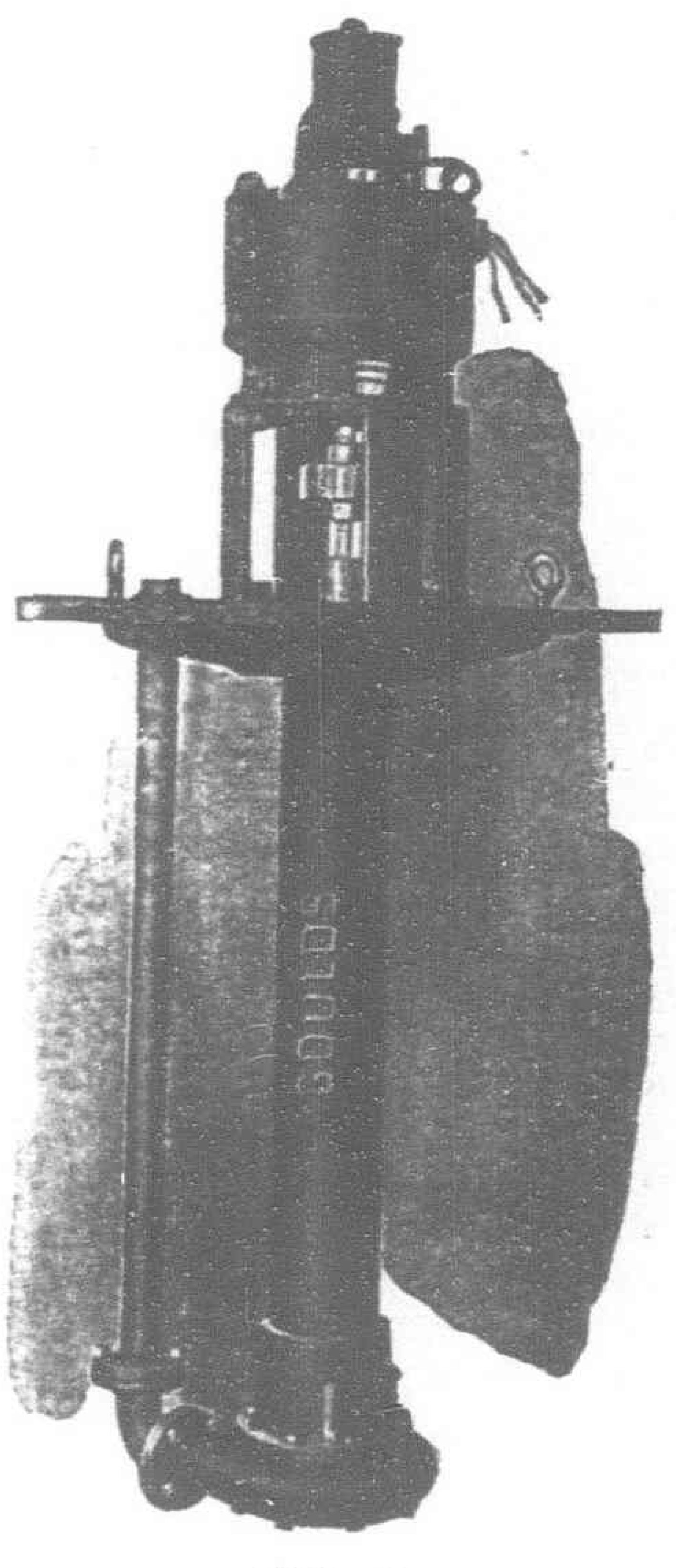


FIG. 1

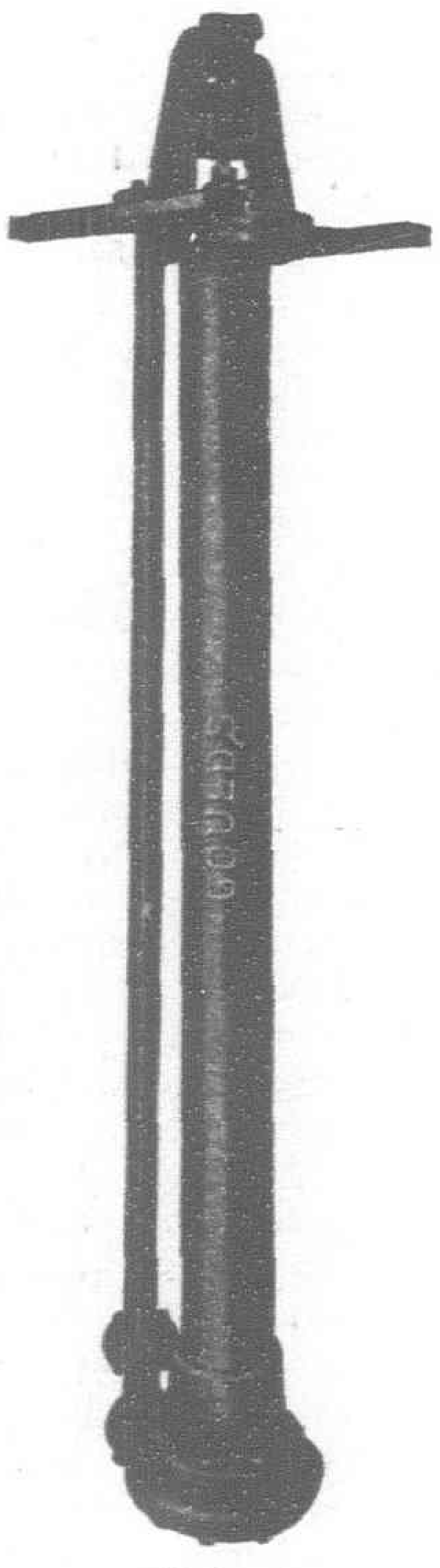


FIG. 2

The electric motor is controlled by a starting device, actuated by a float in the sump. When the liquid rises to a certain level and the float is lifted enough to close the switch the motor is started. It continues to operate until the sump is nearly empty, when the float drops back to the position where it opens the switch.

For service where electric current is not available, a similar pump has been developed, equipped with a pulley for belt drive by a gasoline engine or other power. This pump is shown in Figure 2.

The Papua Find.—The discovery of oil in Papua (British New Guinea) was one of the "flukes" often recorded in this connection. A native boy was chastised by a miner for putting kerosene in his tea. The boy stoutly affirmed his innocence and offered to show the miner the well from which the water was drawn. The miner found that the well was thickly covered with kerosene. Thus was discovered a field which is expected to develop into a huge commercial asset. If anticipations are realized the Government should compensate generously the miner for the outrage to his palate and the boy for the excoriation of his back.

Oil Companies in Burma.—The Burma Oil Company distributed a smaller dividend this year than last, but the shareholders have not much cause for complaint. The dividend was 15 per cent. against twenty per cent. the previous year. Not only has the company a large general reserve, but it has just put aside substantial sums for depreciation and other specific contingencies.

A new company called the Lower Burma Petroleum Co., Ltd. has been formed. It is a joint stock concern with a capital of £25,000 divided into 22,000 preference shares of £1 each, and 60,000 ordinary shares of the one shilling each.

FOOD WILL BE SERVED

A PLAN TO ACQUAINT THE PEOPLE WITH THE USES OF CORN.

The shortage of rice throughout the Philippines has called attention to the undeveloped possibilities of corn, which grows everywhere and lacks only the application of the proper methods in planting and cultivating to greatly increase its yield.

To this end the Bureau of Education has already instituted corn growing contests for the pupils of the public schools and is new arranging a series of demonstrations to show the preparation and use of corn as a table food. It is the intention to have these demonstrations in all the provinces, and at such times as to attract the attention of the greatest number of people. In addition to exhibiting the best corn to be found, the people will be instructed as to how to test and select their seed corn; how to use hand corn mills; also the different methods of cooking corn, and how to make hominy.

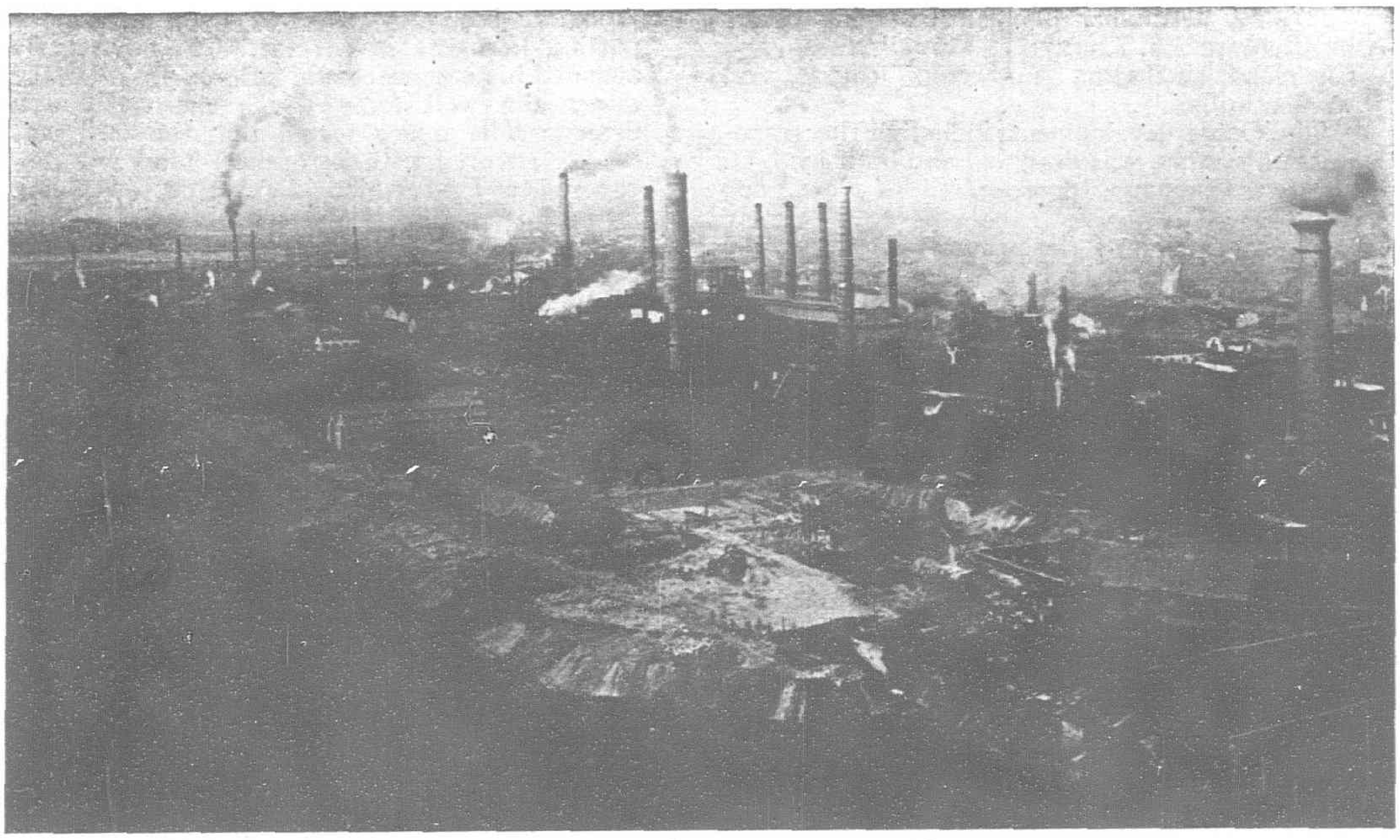
Food prepared from corn will be served free, and recipes in the dialects will be publicly posted and distributed to those interested. The demonstrators will show the actual preparation of food and it is thought that, in as much as the question of an adequate food supply is attracting the attention of the public, these demonstrations will receive the aid and approval of all. There can be no doubt but that such a campaign conducted throughout the Islands will be of great economic value provided it receives the full co-operation of the public, and it is to be expected that the leaders everywhere will take a personal interest in the movement.

Recognizing the truth of the well-known saying that the proof of the pudding is in the eating, the Bureau of Education in its campaign to encourage the production and use of corn is now sending out to all the schools a number of recipes showing how ordinary corn can be converted into palatable dishes.

These and other recipes are being introduced in all domestic science classes and the products of the recipes are being served in the dormitories and the various schools.

In order that the use of corn as a daily diet may be introduced among all classes of Filipinos only those are used which can be prepared with the ingredients and utensils found in the ordinary Filipino home. Where satisfactory recipes for preparing corn are found in any locality they are being copied and sent out to all the schools in the Islands.

It is thought, as a consequence of this plan, that corn as a table food will be held in higher esteem, thereby taking its deserved place as a daily ration and lessening in a measure the suffering that may be caused by the scarcity of rice.



THE HANYANG IRON AND STEEL WORKS

THE HAN YEH PING CORPORATION

GOVERNMENT CONTROL DESIRED

An extraordinary meeting of shareholders of the Han Yeh Ping Coal and Iron Corporation was held at the Chinese Y. M. C. A. at Shanghai recently. The corporation is said to have been in financial difficulties since the revolution and the meeting was called to consider two alternative proposals. These were as follows:—

Proposal A.:—To demand that the Government take over the Corporation as a State concern by purchase. This proposal was framed on the ground that inasmuch as the Corporation had suffered tremendous losses since and owing to the Revolution, and as order had not yet been restored everywhere, and the law was consequently without effect, future progress would be beset with difficulties beyond the resources of a private company to surmount. Moreover, as the Government, after the unity of the whole nation was achieved, would undertake extensive work of contruction of railway lines, large quantities of steel rails of the Corporation would be requisitioned.

Proposal B.:—This proposal is embodied in eight paragraphs as follows:—

(1) To cease at once the yearly payment of a fixed rate of interest to shareholders.

(2) To prolong the terms of loans from the foreign banks.

(3) To try to get the rate of interest on loans from the native banks and firms lowered, and to repay these loans gradually.

(4) To request the Government to stop taxing the iron, and to exempt machinery and materials purchased by the Corporation from import duty, and steel, coal and other products of the Corporation from the export duty.

(5) To request the Government to cease charging interest on, and to prolong the terms of, the loans lent to the Corporation by the Ministry of Posts and Communications, the Taching Bank and the Bank of Communication of the former Dynasty.

(6) To request the Government to give proper protection to the Company in its resumption of work and in the transport of its products.

(7) To demand the grant of a subsidy from the Government.

(8) To demand the right of priority for the Corporation in supplying all kinds of railway materials required by the Government in future.

There were present 573 shareholders, representing 163,903 shares, the number of votes that could be cast was 92,164. After the proposals had been explained a ballot was held, which disclosed 86,985 votes in favour of Proposal A, and 5,179 votes in favour of Proposal B; thus the first proposal was decided upon.

HARBOUR ISLAND TERMINALS, SEATTLE

In addition to extensive terminals now installed by six transcontinental railroads in this city, the Seattle Port District, March 5th, 1912, voted $8,100,000 for the construction of dockage facilities, including $5,000,000 for the acquisition of the site and erection of six concrete wharfs 1,400 feet long and 150 feet wide, accommodating forty large steamships at one time. This port expenditure is for the purpose of instituting terminal facilities similar to the Bush Terminals in Brooklyn, N. Y., and the city expenditures are to be duplicated by a New York corporation. This company plans to erect seventy buildings, including several six-story concrete industrial plants, for the accommodation of manufactories. Also modern storage warehouses with every facility for handling raw and finished products; in fact, every equipment known to modern science for the efficient assembling and distribution of commodities at the minimum of time and expense. The above sketch of the Harbour Island Terminals gives an idea of the proposed structures which the citizens of Seattle intend to install in the immediate future. Space, light, heat and power with unsurpassed rail and water facilities will be furnished manufacturers at rates which many now expend for cartage alone.

The Port of Seattle will spend twenty million in the next five years for harbour improvements alone. Gen. H. M. Chittenden, chairman of the Seattle Port Commission and former Government Engineer, sums up the proposed expenditure as follows:

Public Funds Pledged

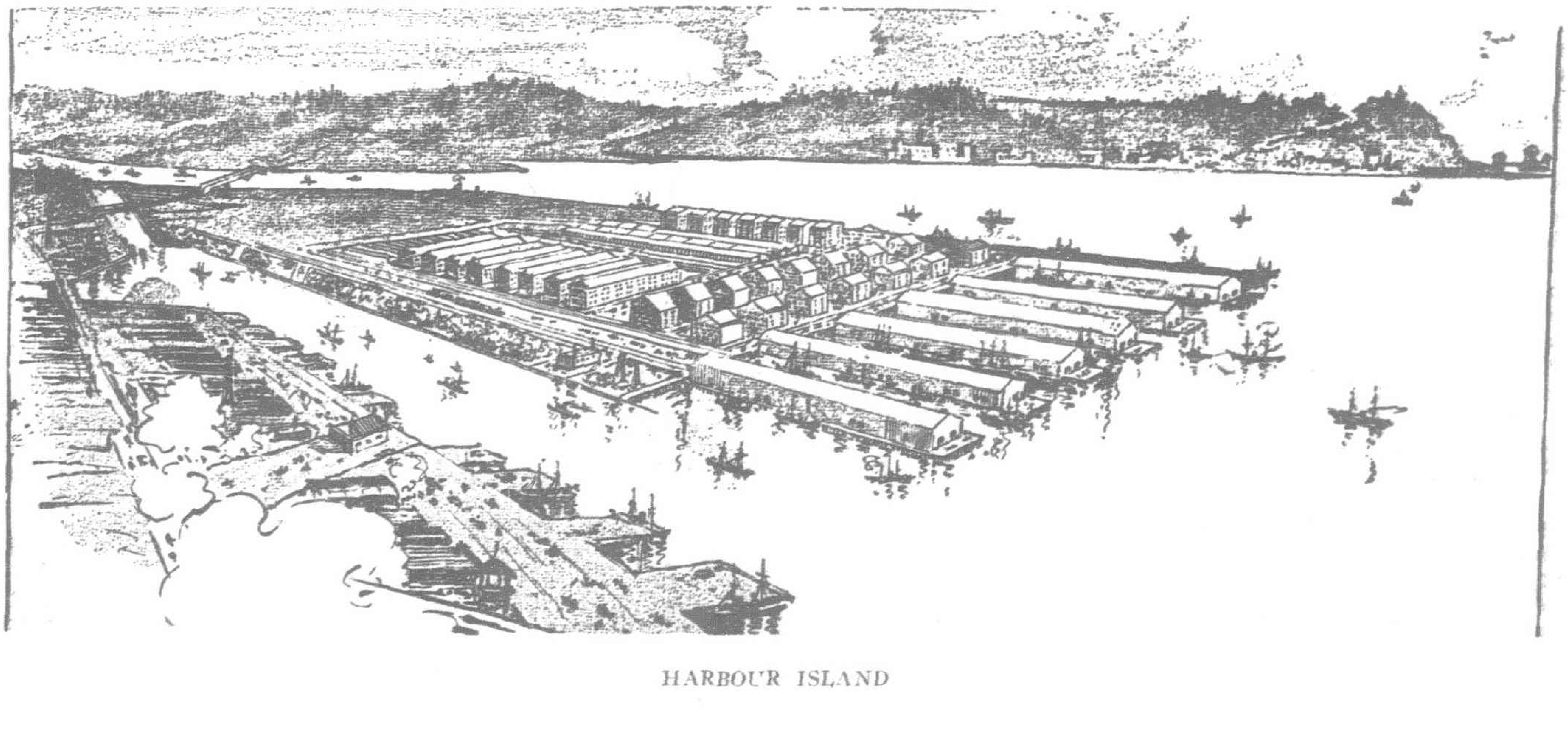
Public Agency	Location of Improvement	Amount Pledged
U.S. government	Lake Washington canal	$ 2,275,000
State of Washington	Lake Washington canal	250,000
County of King	Lake Washington canal	750,000
County of King	Duwamish waterway	600,000
Assessment district	Duwamish waterway	1,000,000
County of King	Renton waterway	50,000
Assessment district	Renton waterway	50,000
Assessment district	Sammamish river	50,000
Port district	Smith's cove dock	1,000,000
Port district	East waterway dock	850,000
Port district	Central water front dock	750,000
Port district	Harbor Island (1)	3,000,000
Port district	Harbor Island (2)	2,000,000
City of Seattle	Harrison Street dock	25,000
County of King	Duwamish dock	350,000
Port district	Salmon Bay	350,000
Port district	Lake Washington ferry	150 000
Total pledged		$13,500,000

Funds, Public and Private in, Prospect

Terminal company	Harbour Island	$ 2,275,000
Post district	Projects on Elliott Bay and Lake Washington canal opened	1,750,000
U. S. government	Duwamish waterway	225,000
Local agencies public and private	Bridges, subways, dock and related improvements	2,250,000
Total		$ 6,500,000

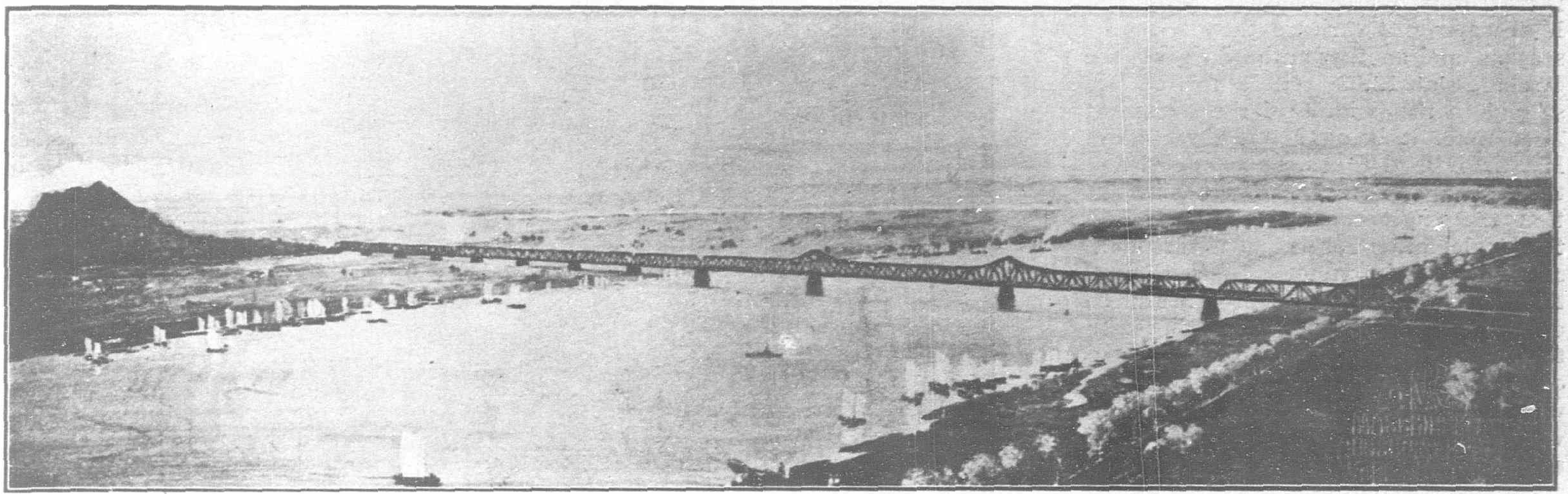
Summary

Public funds pledged or in process of raising	$ 13,500,000
Public and private funds in early prospect	6,500,000
Total for Harbour in Next Five Years	**$20,000,000**



HARBOUR ISLAND

BRIDGE OVER THE YELLOW RIVER ON THE NORTHERN SECTION OF THE TIENTSIN-PUKOW RAILWAY



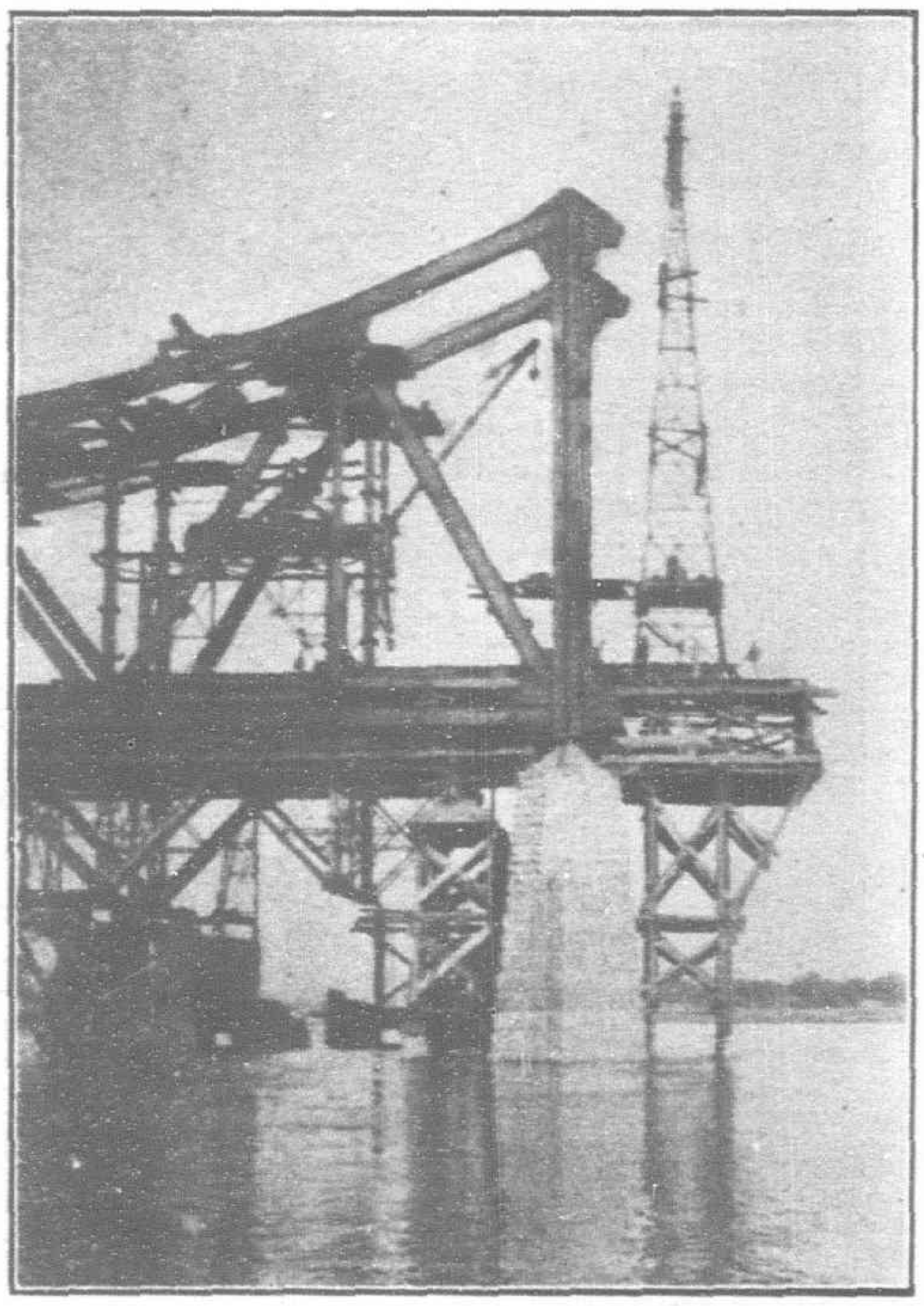
SKETCH OF THE BRIDGE

This drawing shows the number of piers—looking from the up-stream south side of the bridge towards the north. The second pier is the only one in the stream at normal state of the river.

In a very short time the most important railway bridge in China will be completed and handed over to its owners, the Chinese Government. It has been erected over the Yellow River, near Tsinanfu, the Capital of Shantung Province, at a spot some two hundred kilometres from where the river enters the sea, and is designed as portion of the trunk line from Pukow (on the Yangtsze River, opposite Nanking) to Tientsin. The bridge was designed and has been built by the well-known German constructors, Maschinenfabrik Augsburg-Nurnberg, A.—C., Germany, and falls within the northern section of line—that built by German engineers—under Mr. J. Dorpmuller, the Engineer-in-chief.

Work on the bridge was commenced in August, 1909, and the girders joining the central span were linked together on October 9, this section having been projected from the north and south piers without scaffolding.

By December the bridge is expected to be completed and open to traffic. It is 1,255.2 metres (about 4,180 feet) in length, and is built on eleven piers, with abutments at the northern and southern ends. The cost of the bridge is between ten and twelve million marks.

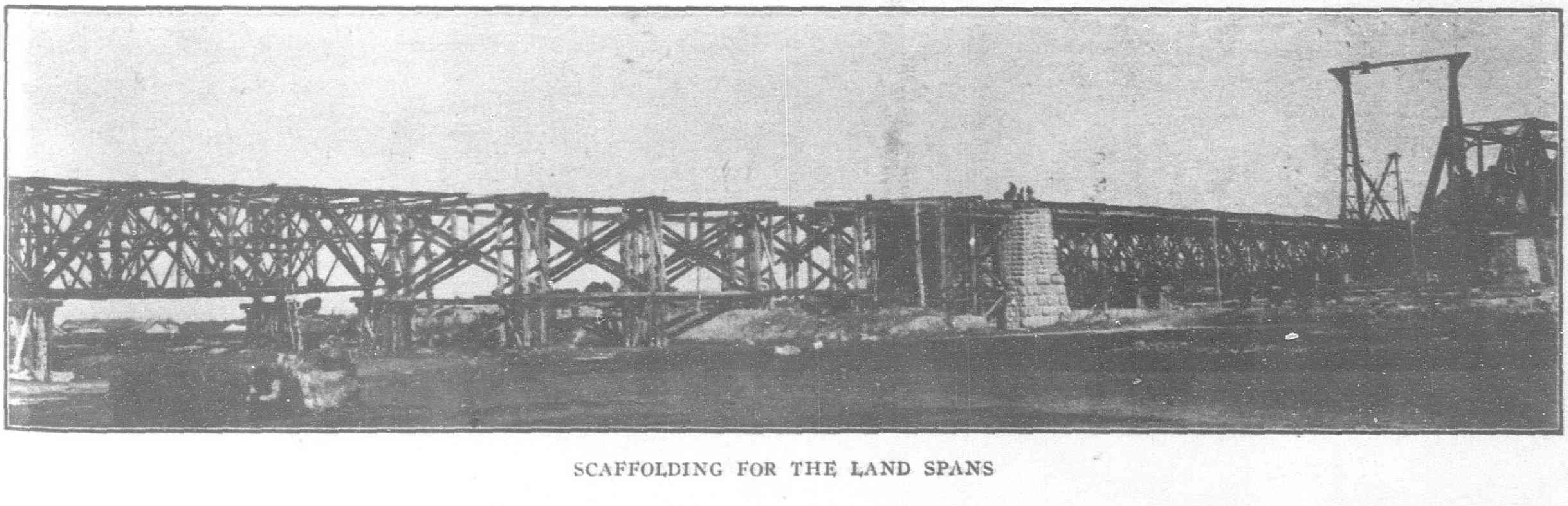


METHOD OF ERECTION

The crane used in the erection of the cantilever section of the bridge.

At the bridge site the river has a width at low water of 400 metres, and at high water it resembles a lake, overflowing the northern bank and stretching to the great dyke some 2,200 metres distant. In this region the country is only two or three metres higher than the low water level, whereas there is a difference between the low and high water marks of five metres. Lower down the stream the actual river bed is as much as sixteen feet above the country in some places, great embankments keeping the water to the channel and delivering it to the sea. At the crossing with the Grand Canal, the Canal waters are much below the bed of the giant stream which has so well earned its title of "China's Sorrow," "The Ungovernable," and "The Scourge of the Sons of Han."

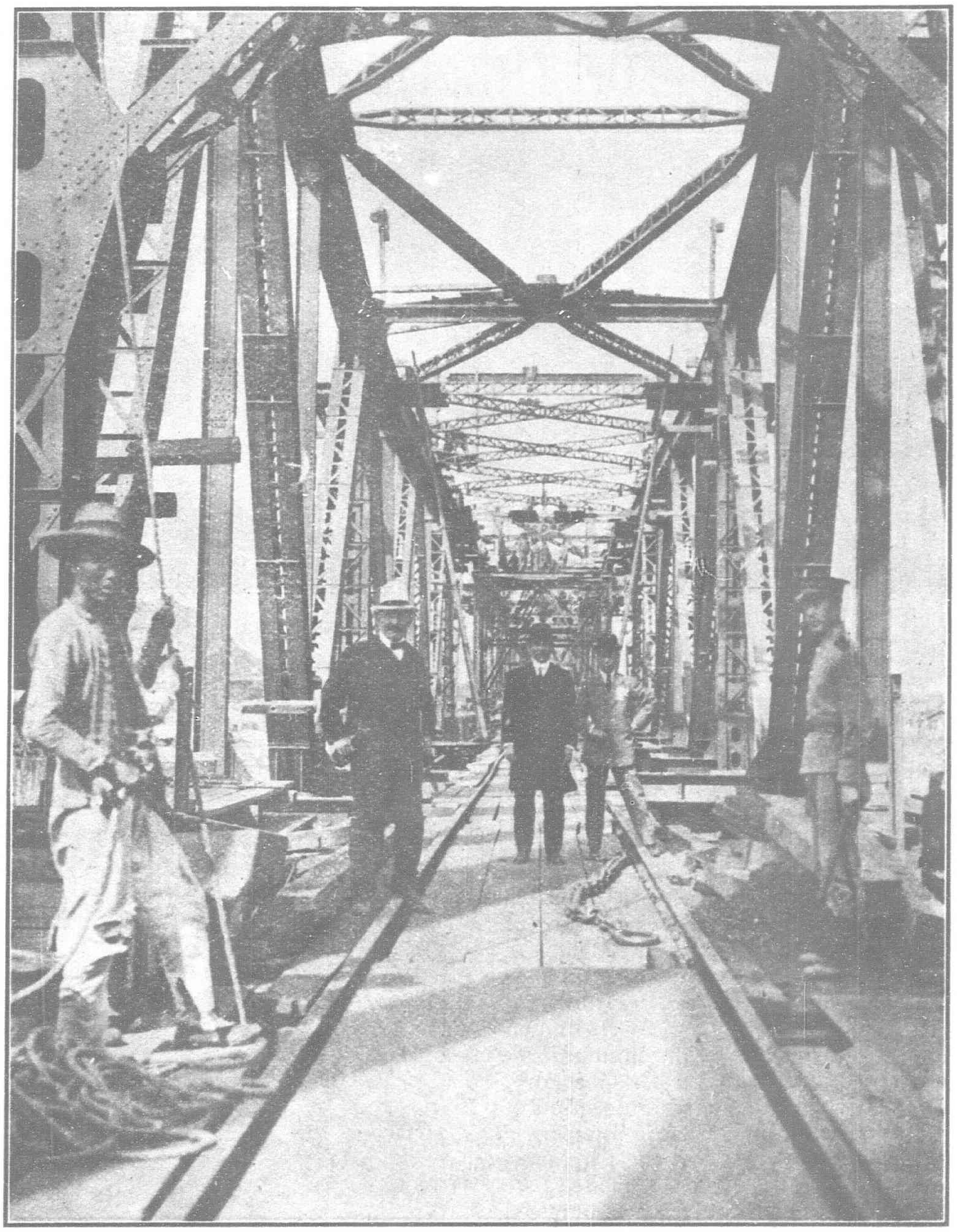
On the south side of the bridge at Tsinanfu the high water embankment is very close to the low water level of the river, only one span being necessary to reach the water. In fact only one pier is in the stream at winter level, the



SCAFFOLDING FOR THE LAND SPANS

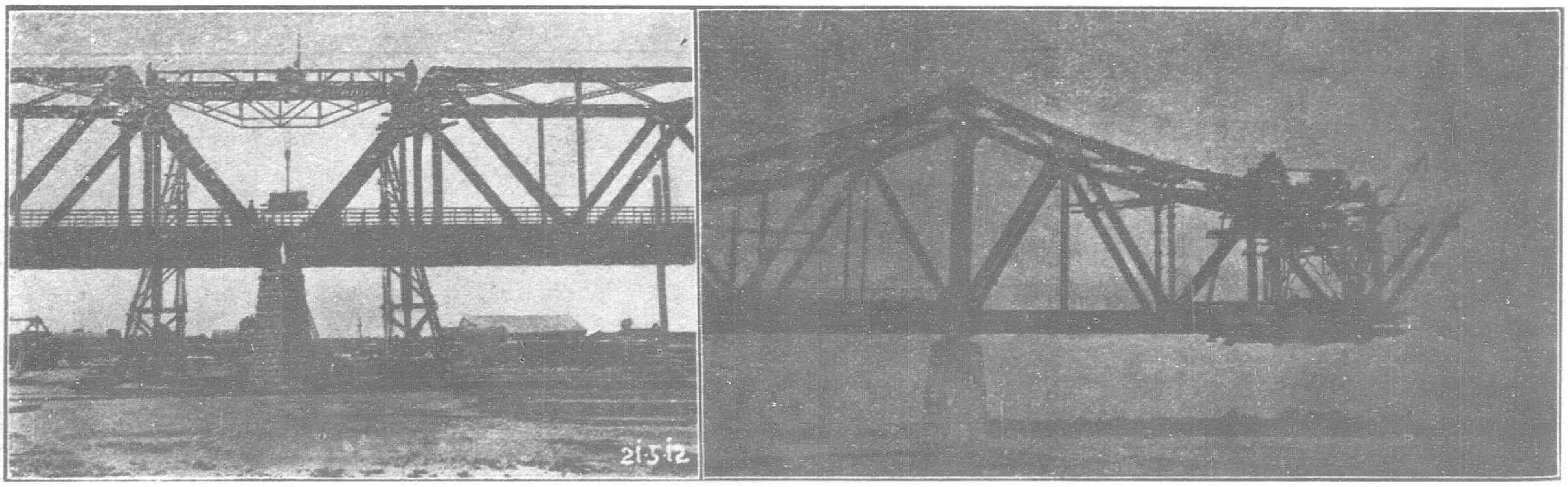
remaining ten being upon the sand flat, one on the south, and the other nine on the northern side.

The velocity of the water at the bridge, as calculated by the engineers, is from four to five metres a second at high water. It varies greatly with the seasons, and another authority gives the discharge at 12,000 cubic metres per second in the middle of the stream at flood time, it being about three times less in normal times. The vagaries of the river are so great and so treacherous that the engineers had to proceed in their calculation for the structure with caution. Their investigations showed them that the bottom of the river to a depth of two metres is constantly moving with the stream; they soon learned that any obstructions to the stream was fraught with danger, and the discovery that violent whirlpools were formed by such prevented them building the central span from scaffolding. In designing the piers, too, they had to consider the possibility of the stream changing its course. It is notorious in history for its meandering propensities. From time to time it has run to the north or south of the Shantung mountains, emptying either into the Gulf of Chihli or the Yellow Sea. It has been in its present course but about 60 years, and adopted it owing to a channel having been prepared by the less important Tsi-ho, or Taching-ho, the original bed of which was discovered during the excavation for the foundations of the piers some 17 metres below the present low water mark of the Yellow River, where was found a very tough packed clay and loess formation impossible of dissolution in running water. The ground above this clay is the deposit of the Yellow River, which carries in suspense enormous quantities of matter brought down from the great loess country in Kansu and other provinces through which it flows, giving the name to the river, and causing it to silt up so rapidly that it can only be restrained from incessant change of course by the erection and maintenance of huge dykes, which, as has been previously mentioned, confines and carries it high above the vast surrounding plains, despite the



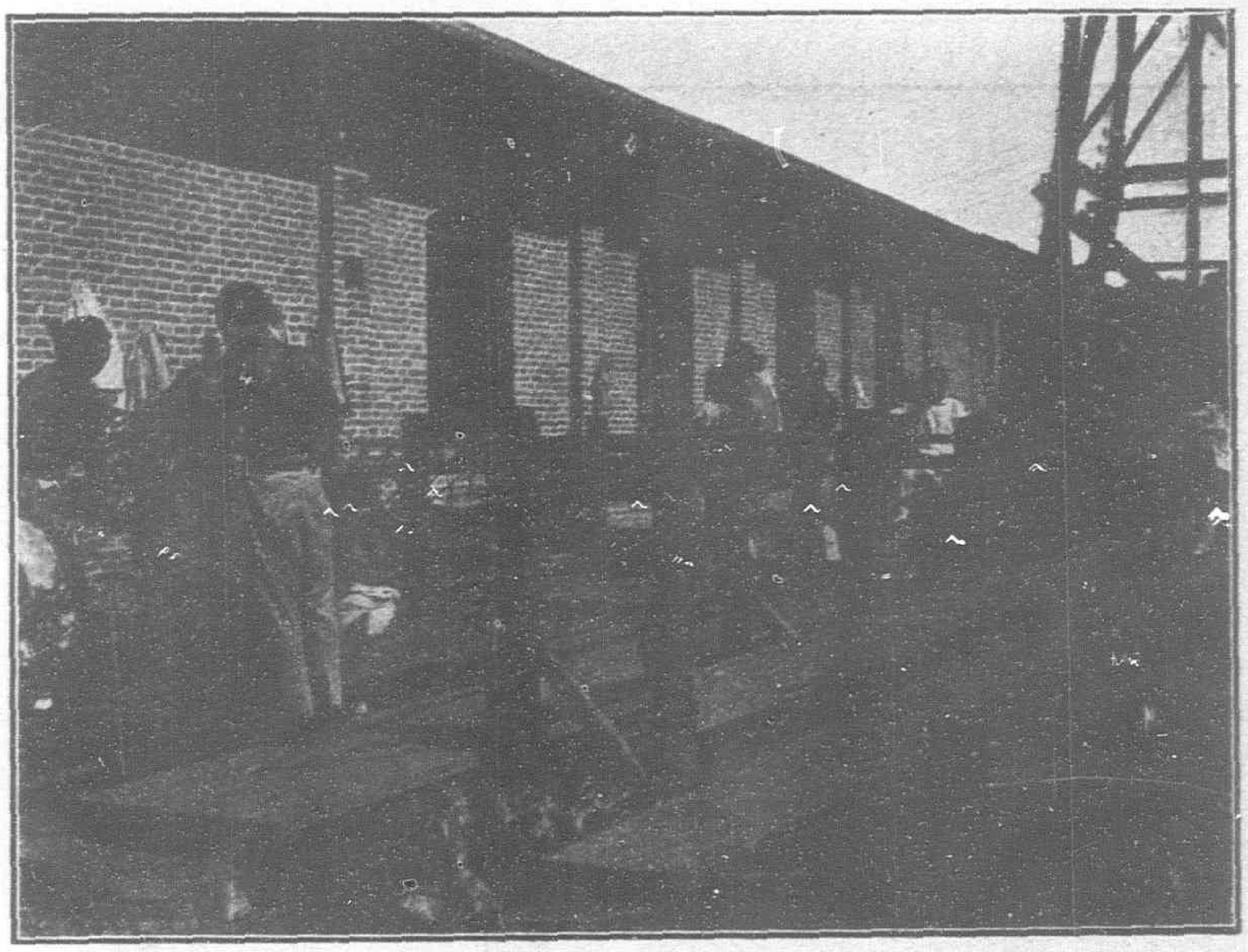
DR. SUN YAT-SEN ON THE BRIDGE

This photograph was specially taken for the FAR EASTERN REVIEW on Sept. 26. Dr. Sun Yat-sen is standing on the centre of the track; on his left is Mr. Chu Kinhow, the Associate Director of the northern section of the Tientsin-Pukow Line, whilst on the rail in the foreground is Mr. Karl Preiss, Resident Engineer of the Bridge.



SHOWING THE METHOD OF ERECTION

IN THE EARLY STAGE
Looking towards the north bank of the river



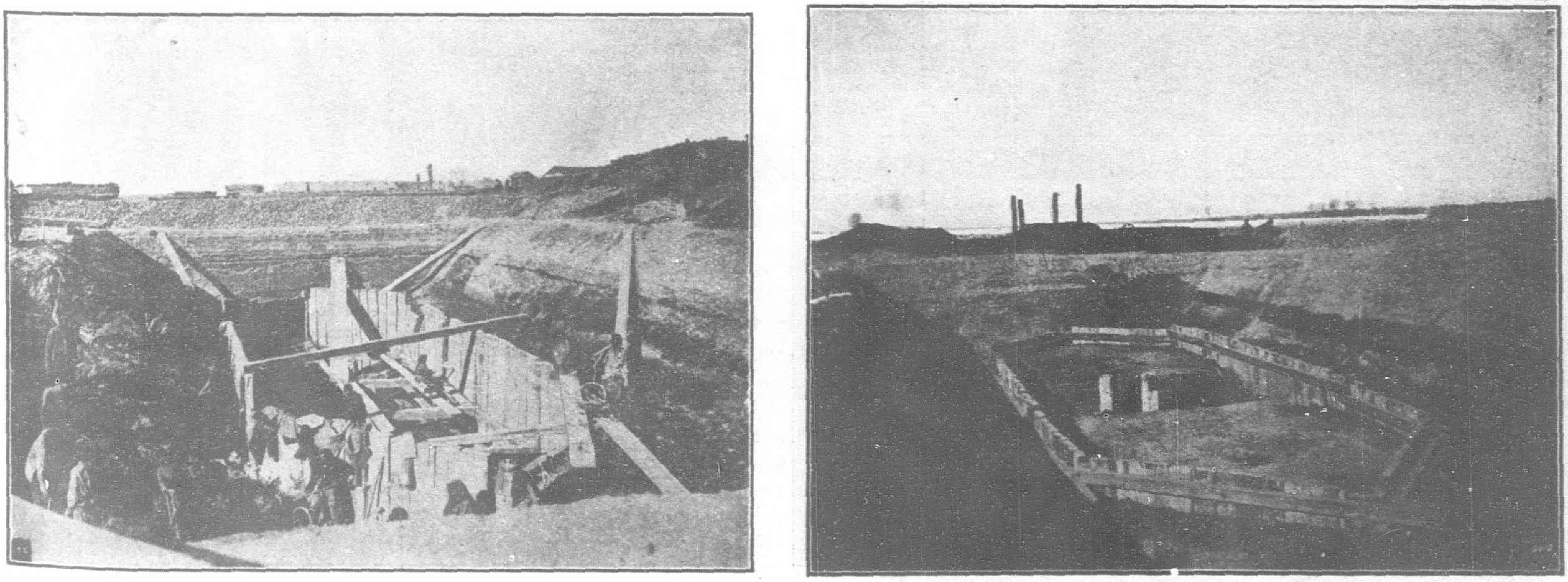
MAKING REINFORCEMENTS FOR PILES

tremendous volume of water constantly flowing. The changeableness of the stream necessitated great attention being given to the pier foundations, and consequently they were sunk so deep that undermining by water is now a practical impossibility. The engineers have prepared for exceptional deviations and depths and even if changes occur, the extent of which might not now be foreseen, it is calculated that the bridge will not be affected.

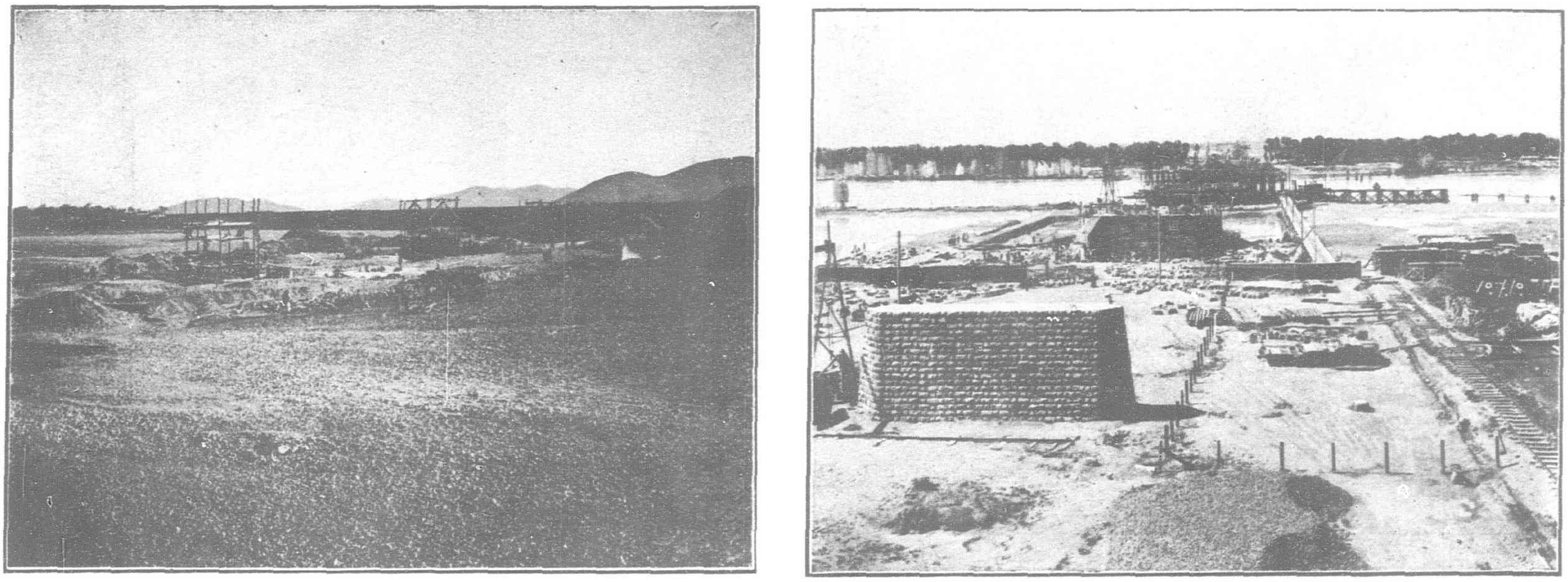
In forming the foundations of the piers, except the one now in the middle of the stream, steel reinforced quinquangular concrete piles, having a superficial sectional measurement of 0.123 square metres, a length of from 15 to 17 metres, and tested to carry a load of 150 tons each, were driven, 176 being beneath the first pier on the southern side, 240 beneath the third (the second pier is without piles), 176 beneath the fourth, and from 106 to 90 beneath the balance. So many piles have been driven in fact that it is calculated that even should the earth be washed away from the concrete foundations of the piers the piles alone would carry the bridge with thorough safety to traffic. To prevent the action of the water affecting the foundations, however, aprons of stone, with piles, have been built round each pier, that guarding the pier in the centre of the stream having a length, inclusive of the pier, of 92 metres, and a width of 34 metres.

The two side abutments and the land piers, which are only touched by exceptionally high water with very little velocity, and in ordinary times are on high and dry land, have been erected on reinforced concrete piles 15 metres long. The base of the foundation of each pier is from six to seven metres below the level of the ground, and the points of the piles (which are iron sheathed) are some 13 metres below the base of the foundations, the heads of the piles being embedded in the concrete foundations about two metres. Excavations were made and timbered to enable the foundations of these piers to be constructed, and in this connection work was fairly simple. The pier in the river, and those in the immediate vicinity liable to be exposed to violent attack from the stream, were, however, more difficult. They were built to resist any onslaught, the engineers, in accordance with experience gained of the country in the course of their work and conclusions arrived at by observation, deciding to sink the foundations 17 metres under low water level. Reinforced concrete piles, 17 metres long, were driven a depth of from eight to eleven metres, and upon these was built a rammed concrete foundation.

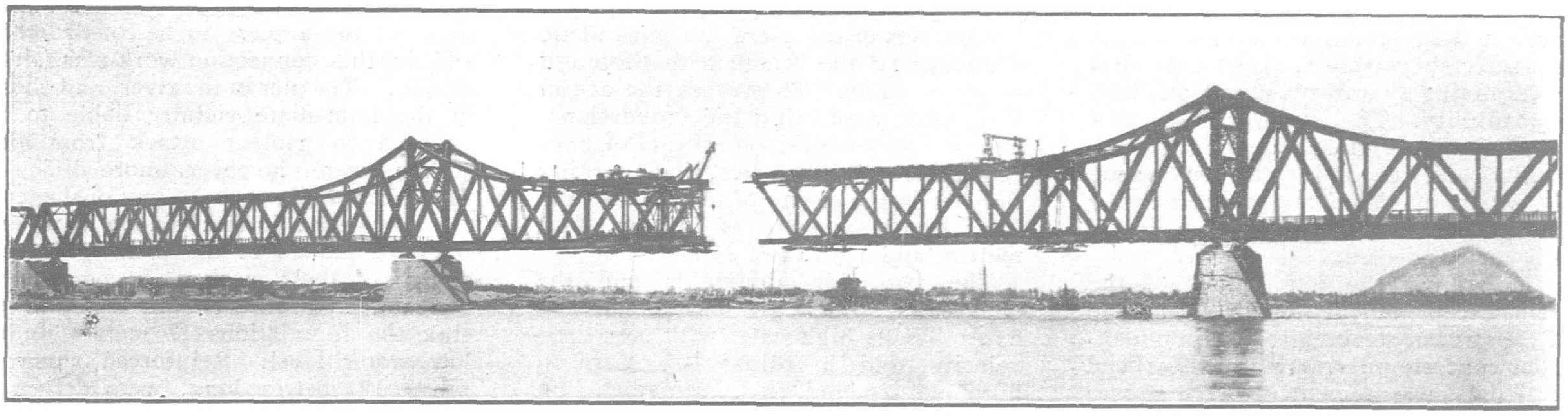
This work was carried out with the aid of steel caissons, which were at first sunk a depth of 13 metres below low water level, so that caissions 14 metres



METHOD IN WHICH THE FOUNDATIONS FOR THE LAND PIERS WERE MADE

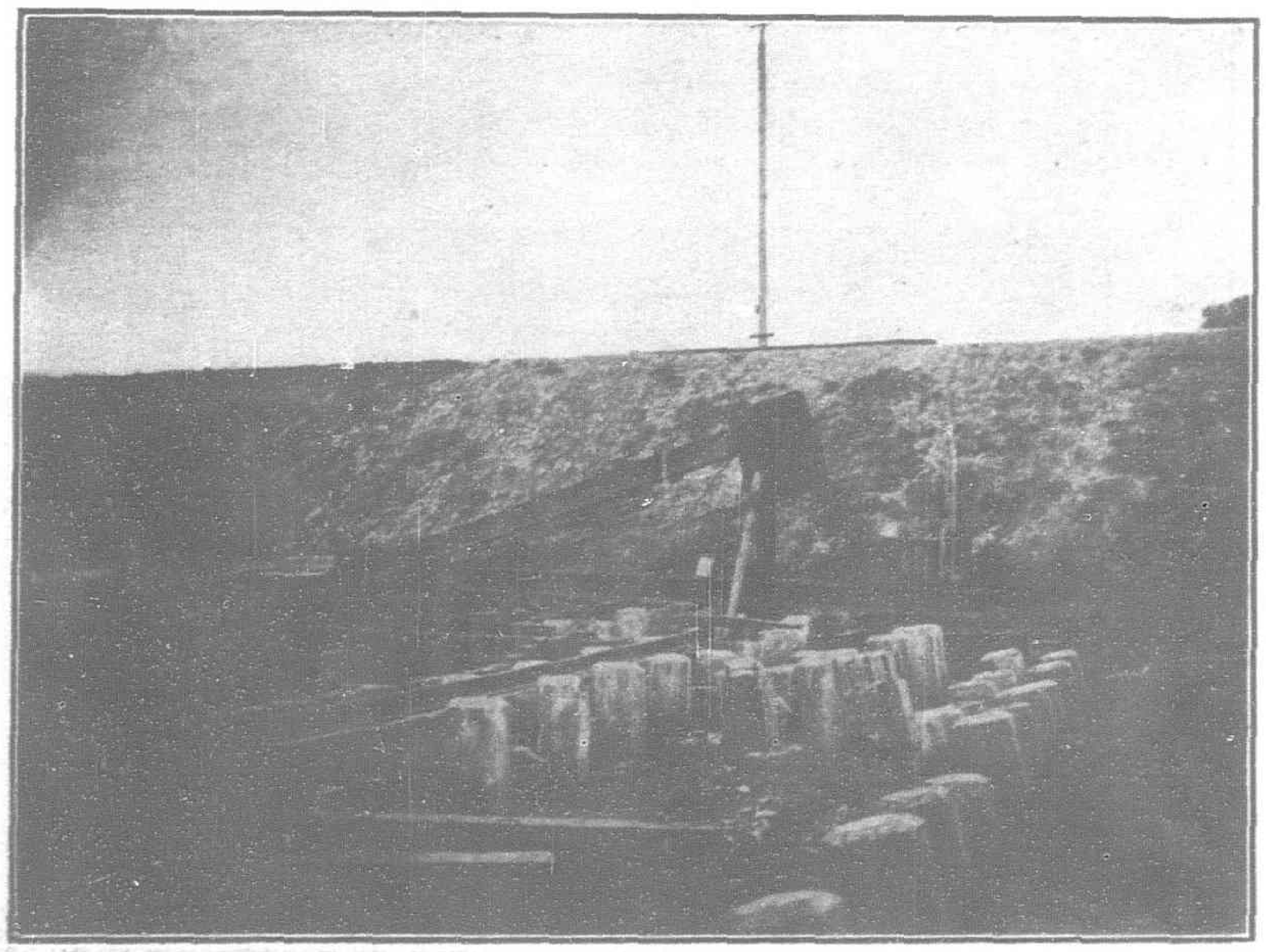


WORK ON THE ERECTION OF THE PIERS

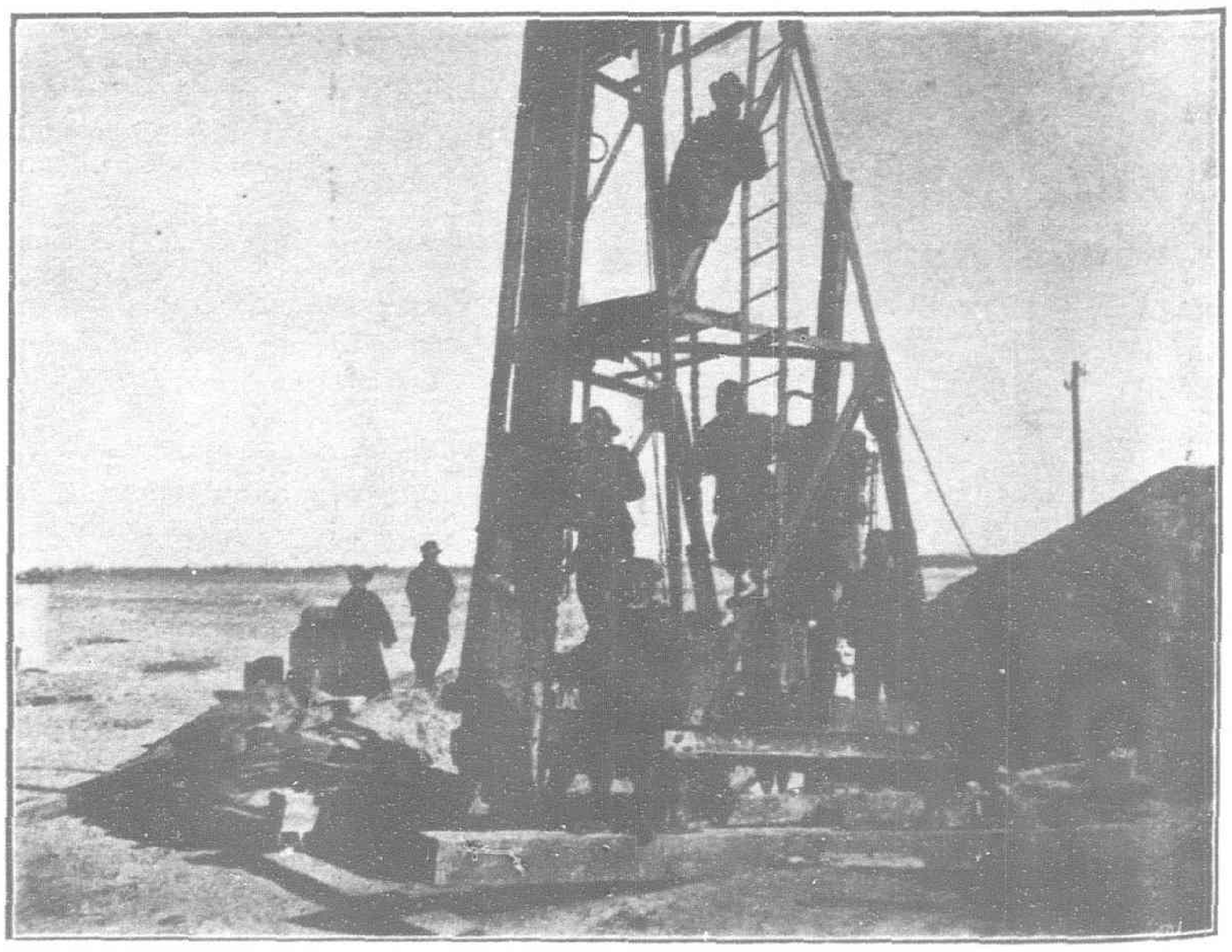


CONSTRUCTION OF THE CANTILEVER SECTION

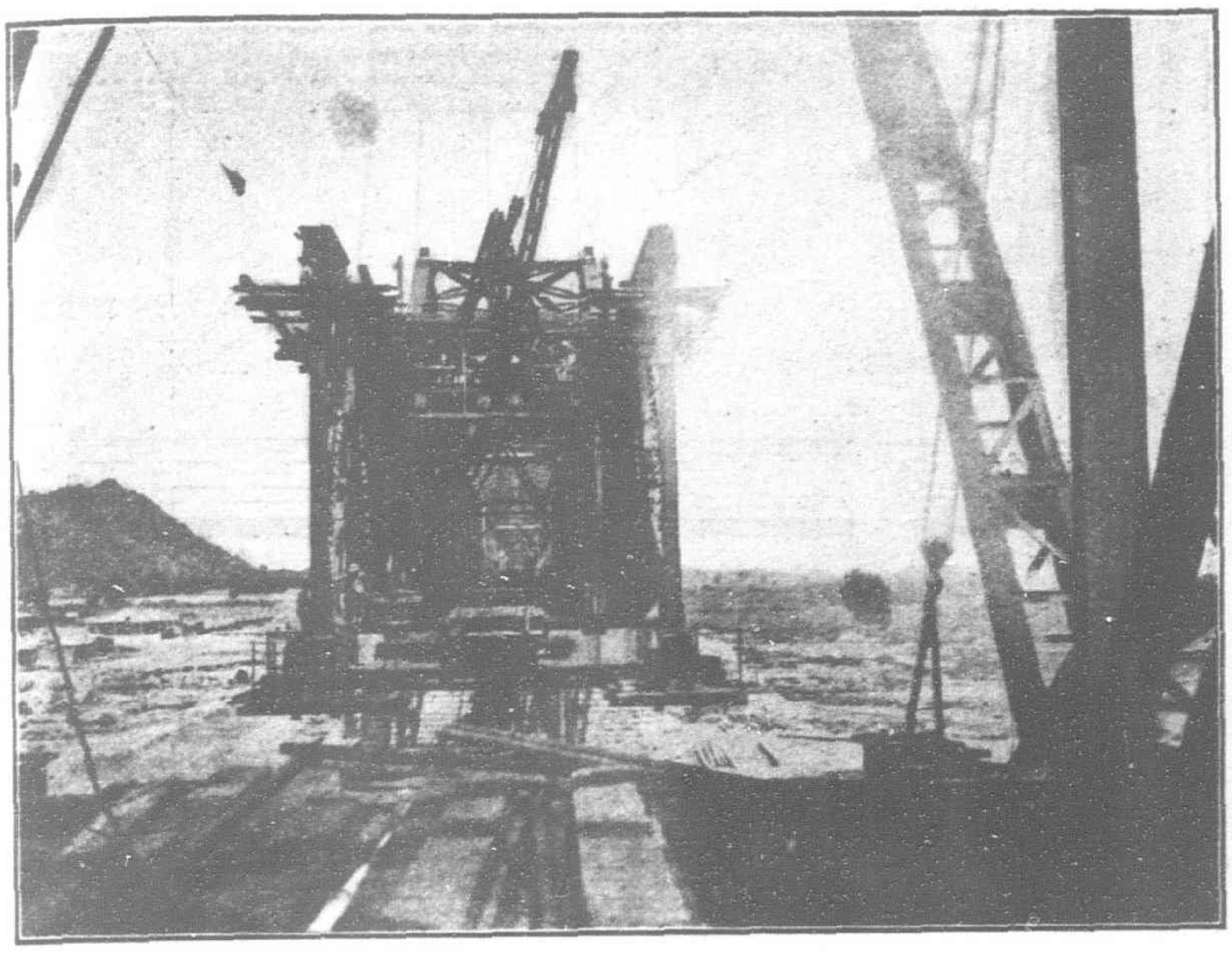
Photograph of the bridge specially taken early in October, looking from the south bank, upstream



REINFORCED CONTRETE PILING

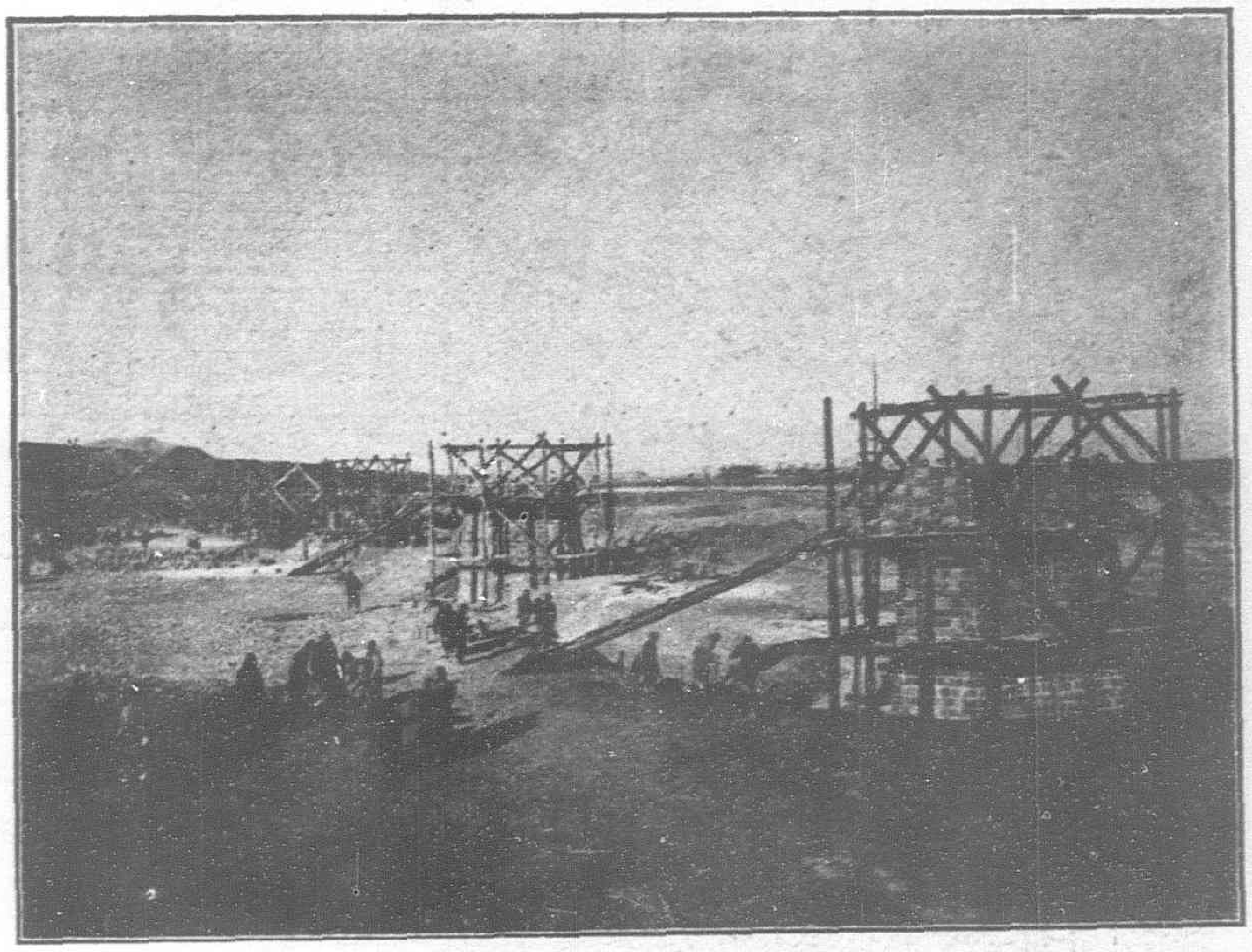


THE PILE DRIVER



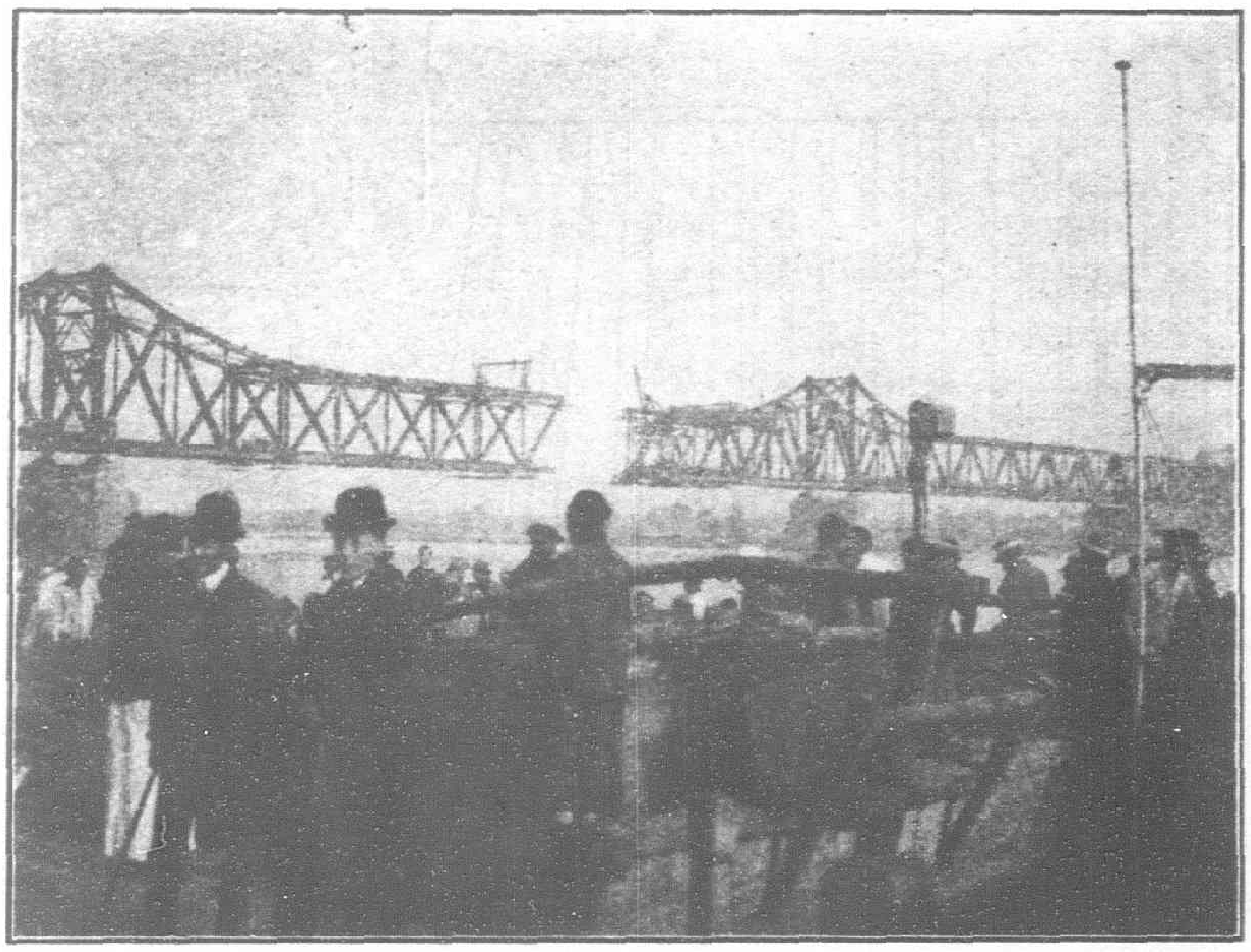
BUILDING THE CANTILEVER SECTION

Photograph specially taken on Sept. 26 from the south side of the central span of the cantilever section



WORK ON THE LAND PIERS

high were just a little above water level. On top of the caisson a steam pile driver was erected, the ram of which had a weight of four and a half tons. With this the piles were driven, though the work was tedious and slow, the resistance of the tough loess and the increasing compression of the ground by the addition of pile after pile preventing the pile sinking but by millimetres at each stroke. After driving the piles the earth between them was removed and the caisson was sunk a further four metres, a mantle of concrete being put in. The first, third and fourth piers, counting from the south side, were built in this manner, but the second pier—which is in the stream—was constructed differently. It is the largest pier under the bridge, the foundations having a superficial measurement of 270 square metres. Piling was abandoned in favor of solid foundations, which were sunk 25 metres below low water level, five metres being in the water, and twenty in the ground beneath the river. The steel caisson and compressed air (which was also used in the building of the foundations of the three piers just referred to) were utilised. The atmospheric pressure inside the caisson varied with the height of the surrounding water, occasionally reaching 35 lbs. to the square inch; the labourers then found work difficult, and were compelled to adopt shorter shifts.



TRANSPORTATION OF PASSENGERS

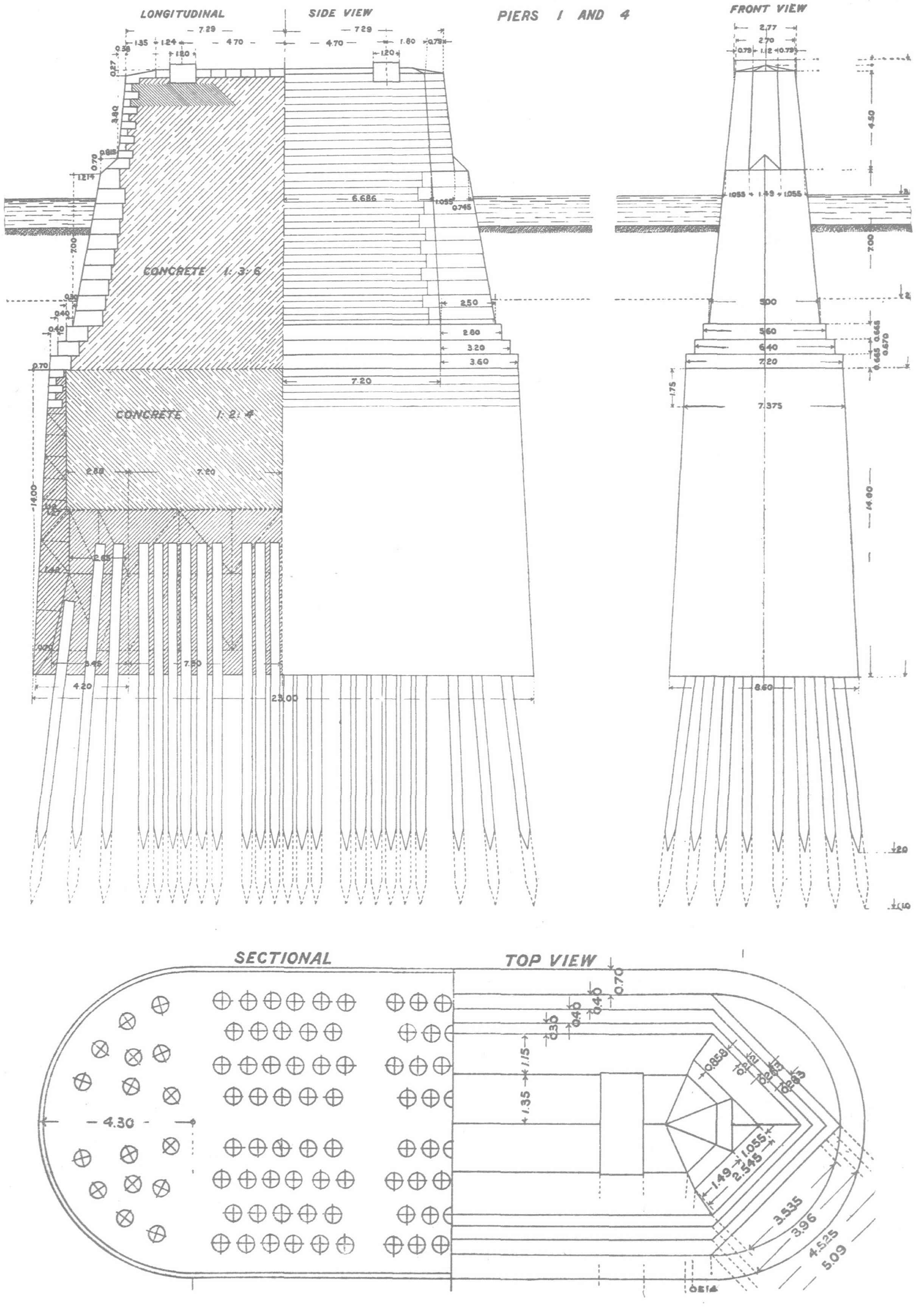
Pending the completion of the bridge passengers were transported across the river on barges. In the foreground stand Mr. Chu Kinhow, Associate Director of the Line, (on the right), and Mr. Wu Ying-fo, Chief Deputy of the Chinese Government Railways, (on the left)

During the construction of this pier the Yellow River showed itself in all its viciousness. It rose to the greatest height experienced by the engineers just at the moment when the frame was ready for the hanging up and sinking of the caisson: later on, just when the work on the pier was about to start, it brought down an exceptional ice drift, which ended with just as exceptional a frost, the whole river being frozen from bank to bank, enabling pedestrian and cart traffic to be carried on its surface for six weeks. However, these and other unexpected tricks of the river did not find the engineers unprepared. Safeguards which had been planned from the beginning stood every test, and flood and ice drift passed without doing any harm to the work in progress.

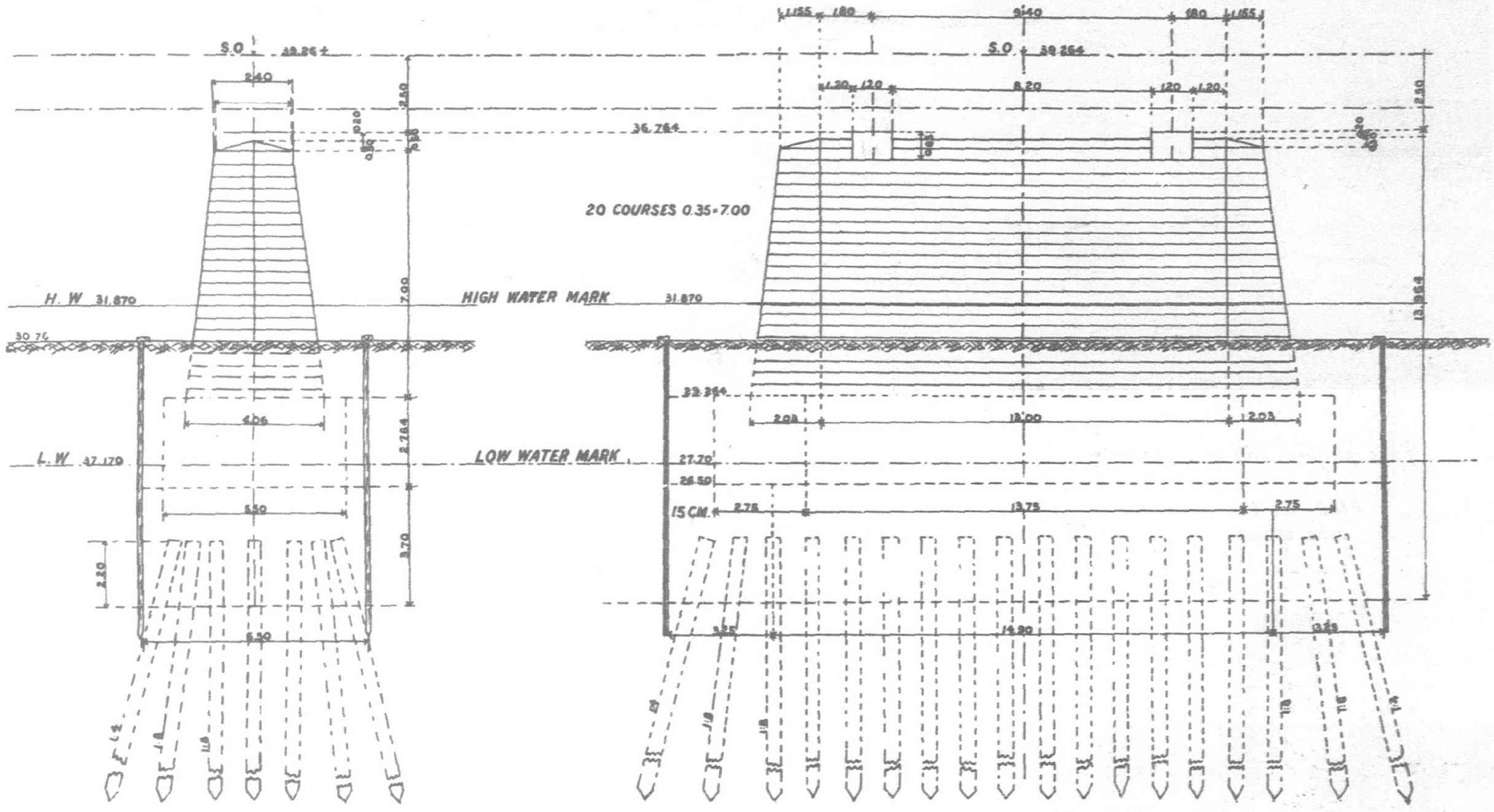
As has been indicated use was made to a considerable extent in the foundations of rammed concrete, and the piers were built of the same material, faced with limestone and granite, the bedstones for the steel-work superstructure likewise being of granite. During the work of building the piers Chinese up to the number of 1,500 were employed, but the number was reduced during the erection of the steel work to between three and four hundred.

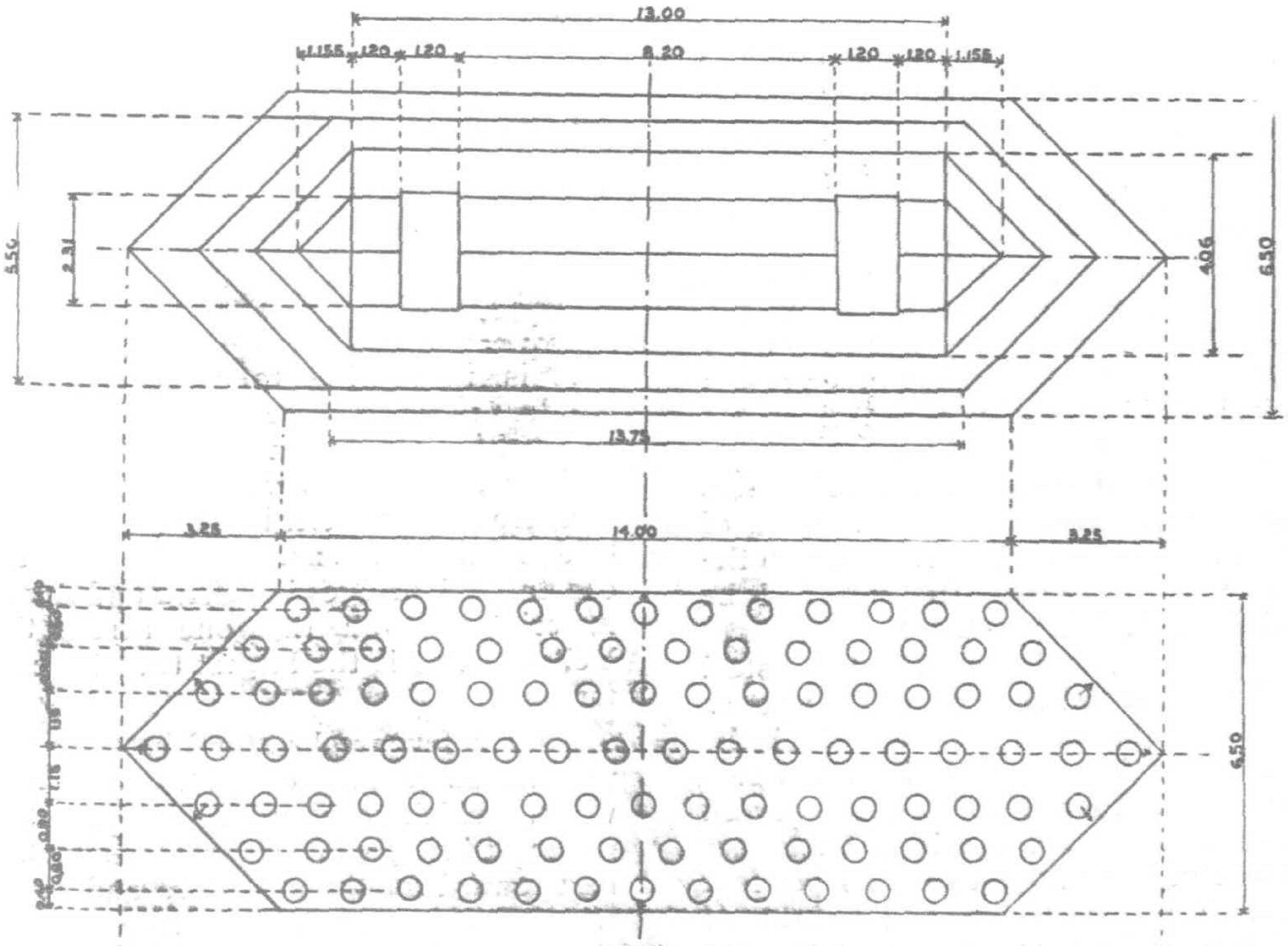
The contract for the steel work was divided with two other German bridge engineering works, and altogether 8,700 tons of girders and beams were used, whilst over 200 tons of rivets were driven at the site, pneumatic rivetting machines being used in this work.

As mentioned above the total length between the south and north abutments is 1,255.2 metres, or 4,180 feet, and consists of the river bridge proper, of three spans—the two side spans being 128.1 metres (about 427 feet) and a central span 164.7 metres (about 557 feet)—and nine land spans 91.5 metres (about 305 feet) each. Of the latter one is situated on the south bank and the remainder on the north. As the sketch indicates the bridge consists of twelve spans of mild steel "through" lattice girders, the land spans taking the form of Pratt trusses, whilst the three central spans over the waterway are a combination of cantilever and Pratt truss, the latter in the central span having a length of 109.8 metres (about 366 feet).


LONGITUDINAL
SIDE VIEW
PIERS 1 AND 4
FRONT VIEW
7.29
7.29
1.35
1.24
4.70
4.70
1.80
0.79
1.20
1.20
2.77
2.70
0.79
1.12
0.79
CONCRETE 1: 3: 6
CONCRETE 1: 2: 4
6.686
1.055
0.745
1.055
1.49
1.055
4.50
7.00
5.00
5.60
6.40
7.20
7.375
2.50
2.80
3.20
3.60
7.20
1.75
14.00
14.00
2.88
7.20
2.65
3.45
7.80
4.20
23.00
8.60
SECTIONAL
TOP VIEW
4.30
0.70
0.40
0.40
0.30
1.15
1.35
0.858
2.545
3.535
3.96
4.525
5.09
0.814

PIER No. 6
SCALE 1 - 100.





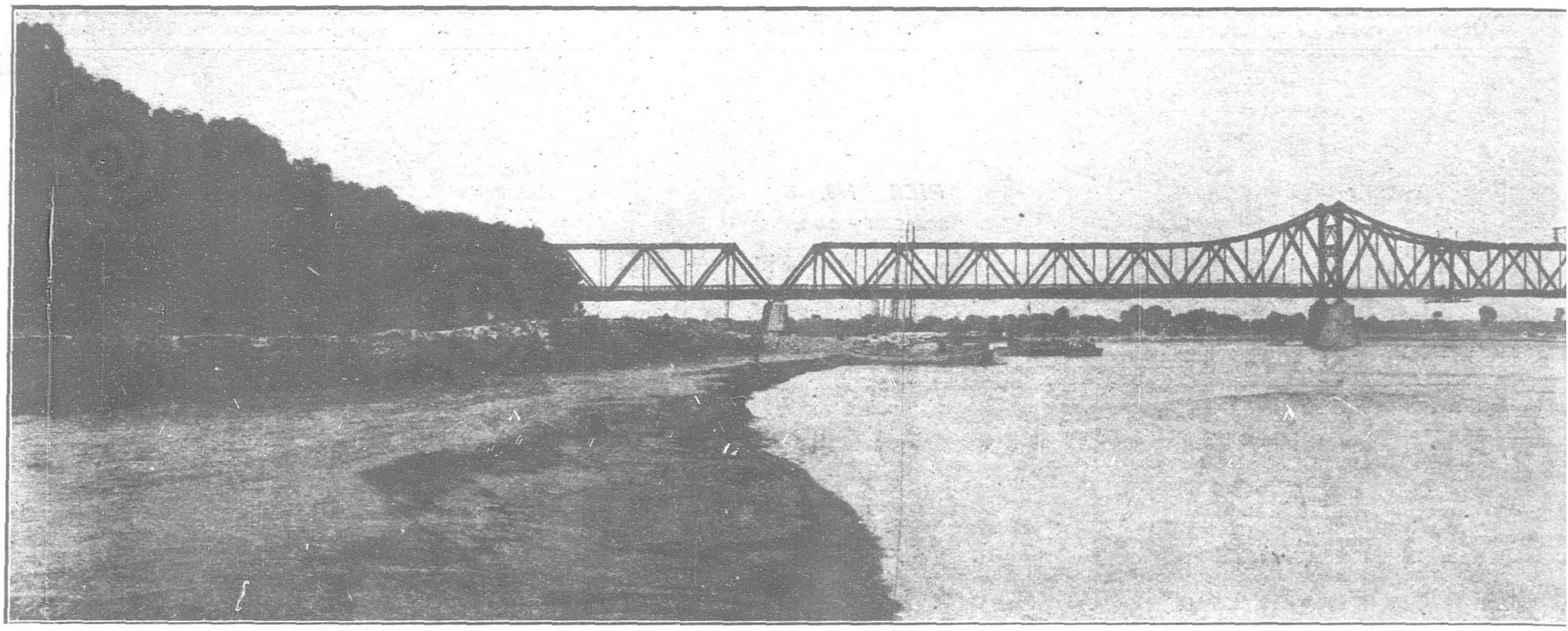
NO. OF PILES. 106

Pier Foundation Plans

of the

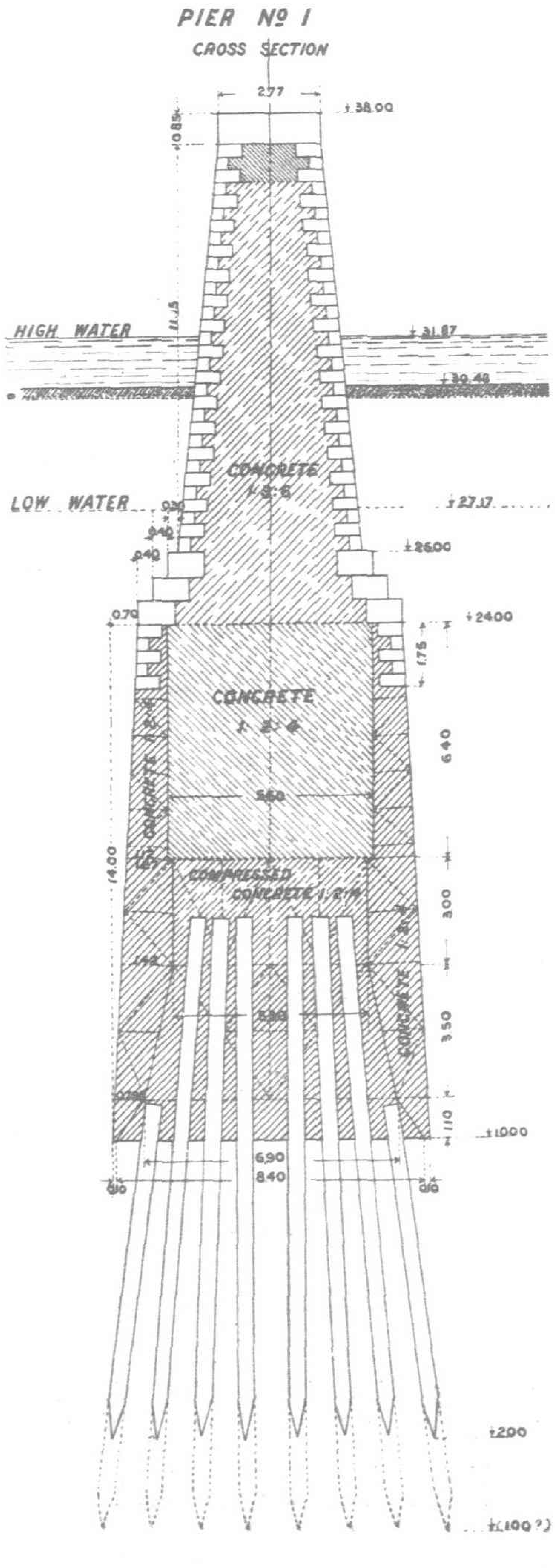
Yellow River Bridge

Tientsin-Pukow Railway Northern Section



PHOTOGRAPH OF TH

This photograph was specially taken after the junction of the cantilever section and is a view of the bridge from the down-stream sout



The track of the centre span is absolutely horizontal, the rail level being 13.5 metres (about 45 feet) above low water level. The land spans on each side for the three main spans fall towards the abutments at a gradient of one in 150 metres.

The designing of the steel superstructure presented a few uncommon difficulties. The engineers were called upon to complete a single track bridge which could be converted with a minimum of cost into a double track one. Therefore the minimum width between the main trusses was fixed at 9.4 metres (about 31 ft. 4 in.), the cross girders were constructed to carry a double track, and whilst the main span was built only sufficiently strong for a single track it has been so arranged that in the event of traffic increasing justifying a doubling of the line the main girders may easily be reinforced without the necessity of interrupting traffic other than to lay the two sets of rails, the reinforcement being the erection of extra girders outside and attached to the existing ones. But many years are liable to elapse before a double track will be called for. The gauge of the line is, of course, the standard one of 1.435 metres (4ft. 8½ in.) and the present track is laid along the centre of the bridge, on both sides being a passage way for pedestrians each 1.75 metres wide. In the event of a duplication of the track these would be removed to the outside of the superstructure, and be carried on steel brackets.

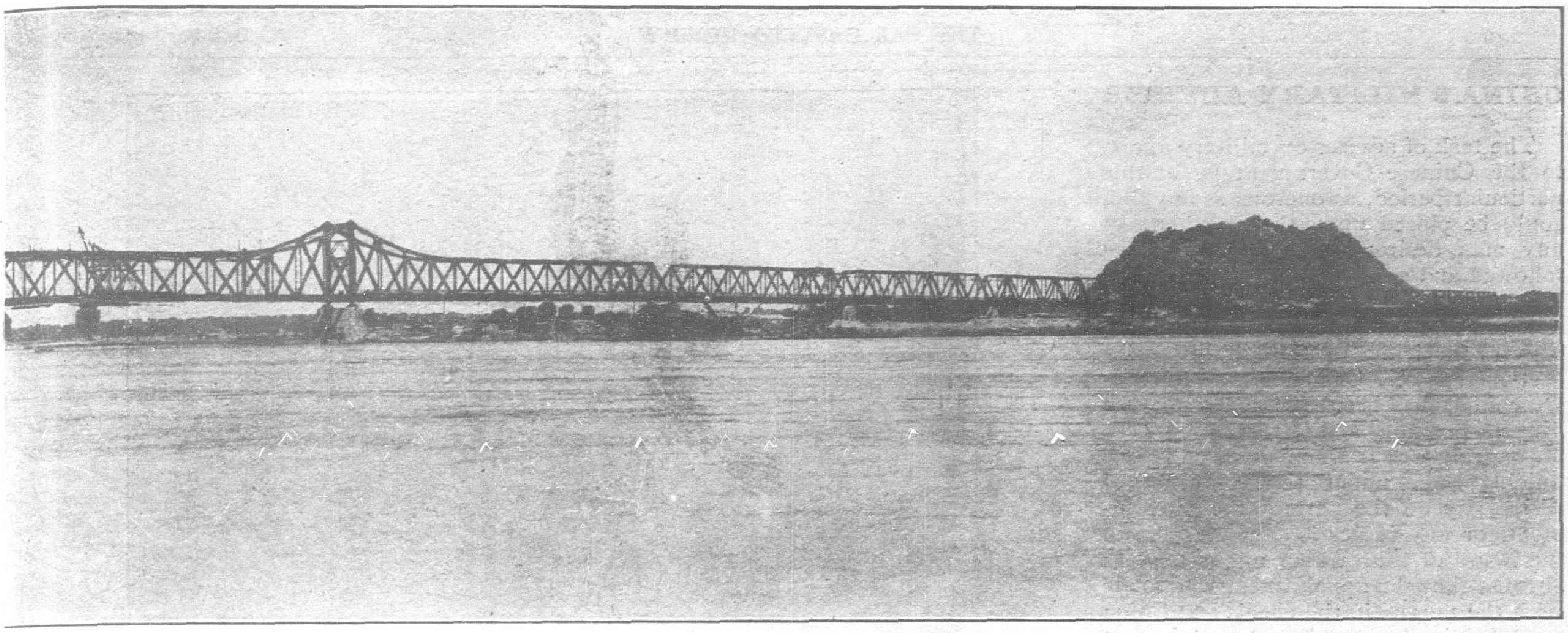
For the calculation of the steel structure the scheme of loads was as follows: The train load on which the calculations for the design were based consists of four locomotives coupled followed by a train weighing 5 tons per metre run (roughly two tons per foot run). The dimensions and weights of the locomotives are as follow: Two leading locomotives 17 metres in length (55 ft. 9 in.) weight 138 tons, greatest axle load 16.3 tons; two following locomotives 18.6 metres in length (60 ft.), weight 149 tons, greatest axle load 20.3 tons.

The erection the land spans, as well as the two side spans of the cantilever section was carried out with the aid of fixed falsework, whilst the central span over the waterway was built out from the south and northern sides without scaffolding. The latter method was adopted owing to the swiftness of the current rendering scaffolding impossible.

Electric cranes were employed throughout the work, and in the handling of the steel-work the European engineers (of whom there were originally fifteen, but in the latter stages only seven) found the Chinese particularly skilful, and their work was at all times satisfactory. The Resident Bridge Engineer is Mr. Karl Preiss, who was born in Mintz, Germany. He commenced his engineering training in 1887 with the firm he now represents, the designers and builders of the bridge. The assistant Engineer is Mr. H. Pluckham.

It is interesting to note that the builders recently were successful in the competition for designs for a bridge over Sydney Harbour, as well as for a bridge at Calcutta, the latter being a steel swing bridge on pontoons. They have also constructed bridges in Africa and South America, though this one across the Yellow River is the largest they have so far built.

Only a few weeks stand between the present stage and completion of this work, which can rank among the foremost bridges of the world, and the best reward for the engineers and those who have helped in the construction is the recognition of their fellow engineers.



COMPLETED BRIDGE

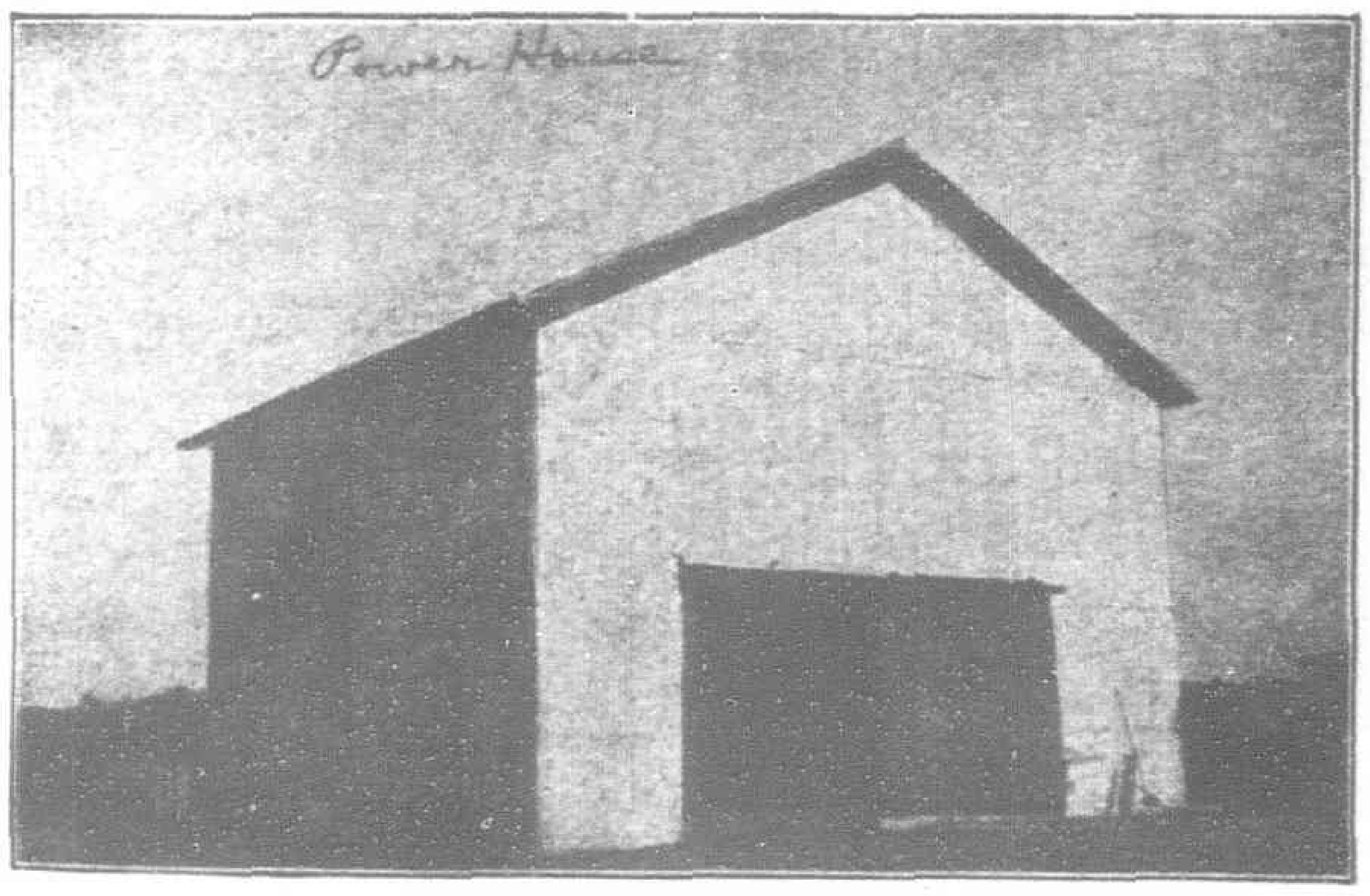
bank, looking towards the north. It splendidly illustrates the imposing structure, and shows clearly the limits of the stream at low water

HIGH VOLTAGE ELECTRIC EQUIPMENT ON THE PLANTATION

By J. F. Ahern

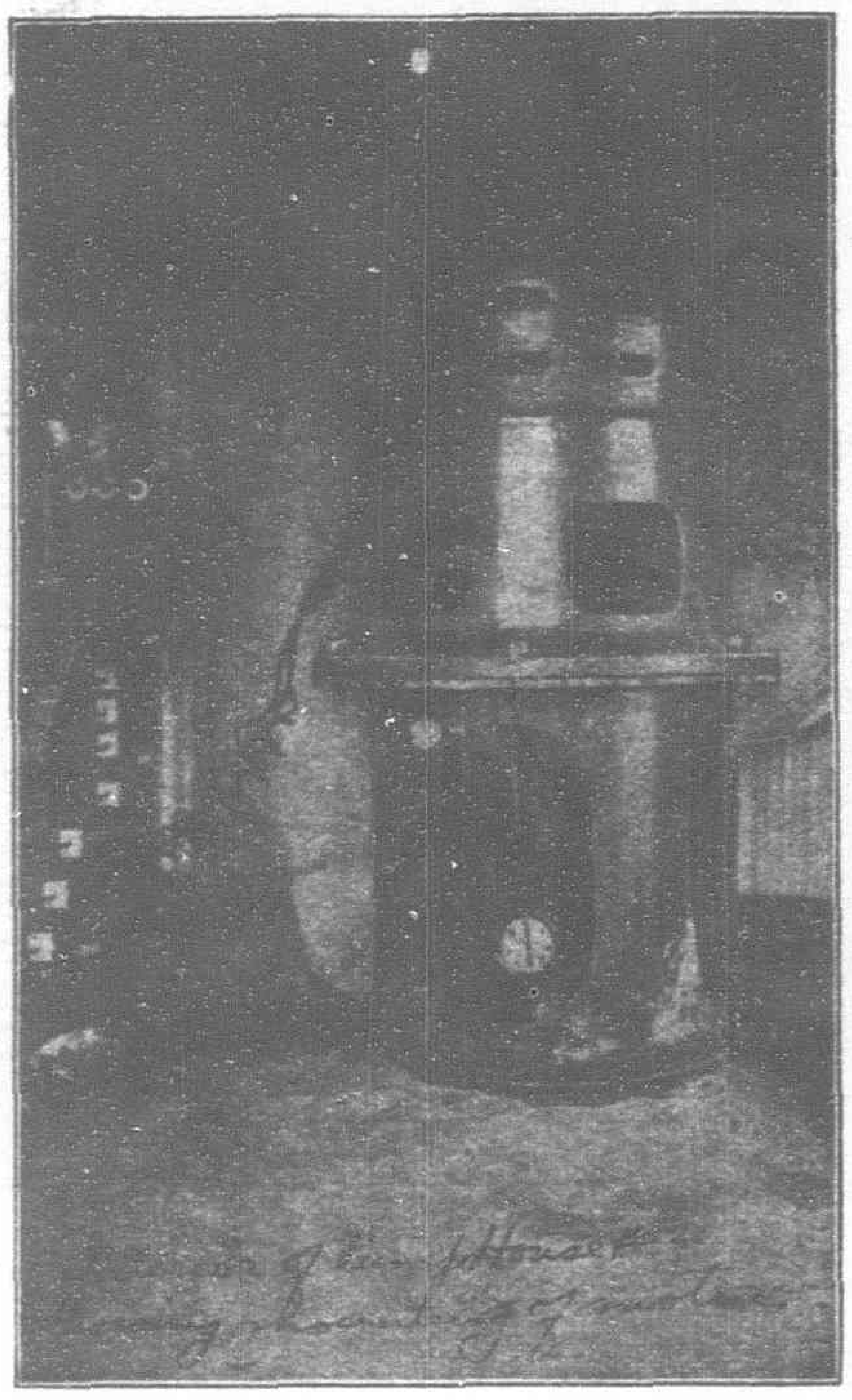
One of the installations which illustrates how closely the planter and farmer keeps in touch with, and turns to his profit, the use of modern machinery, is a pumping outfit operating on the 1,700 acre rice plantation of Floyd Williams, Ellis, La., near Crowley.

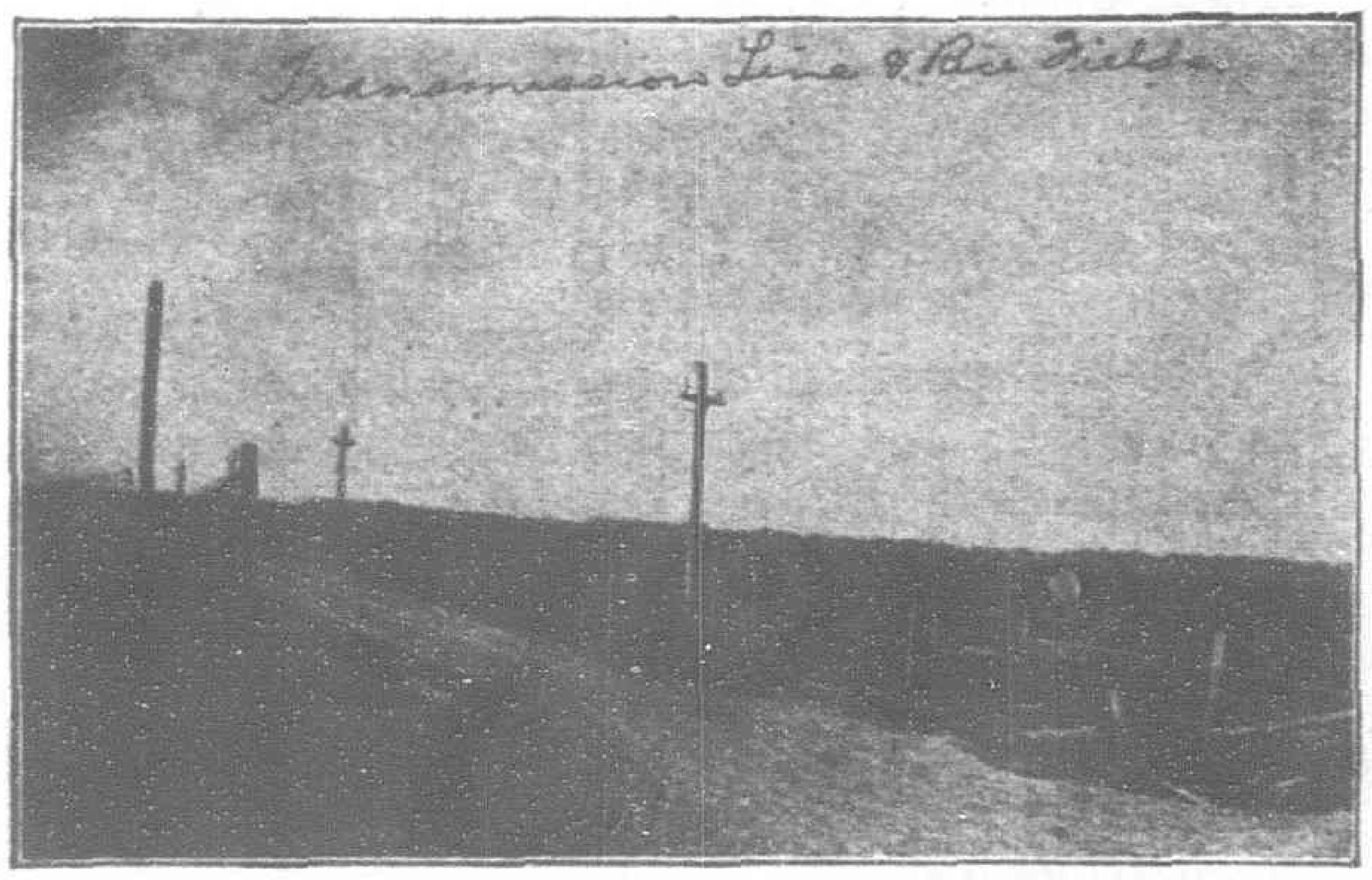
The prime-mover is a Fairbanks-Morse 200 H.P. Four Cylinder, Four cycle, Quick Start, Slow Speed Oil Engine running on low grade oils, direct connected on same cast iron base to Fairbanks-Morse 170 K. V. A., 2,300 Volt, 3 phase, 60 Cycle Alternator, with Exciter and Switch-board.

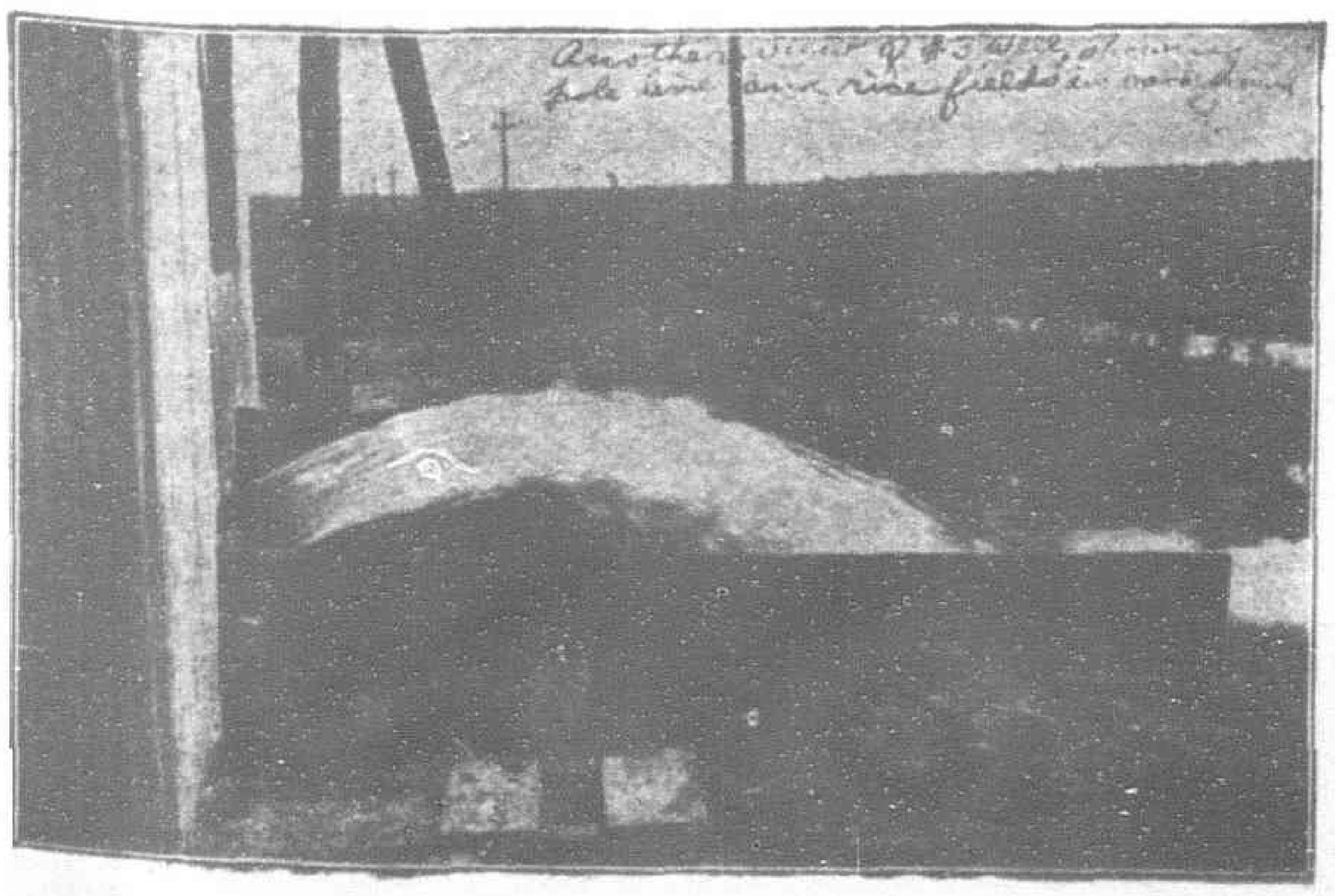


The generating set provides current for operating three 75 H.P. Fairbanks-Morse Vertical Squirrel Cage 2,200 Volt Motors direct connected to Vertical Centrifugal Pumps. One Pump is located at the power house, the second three quarters of a mile away, and the third a half mile further, or one and one quarter miles from the power house.

The current is transmitted over private pole line on Mr. Williams property at 2,300 Volts without transformers, excepting a small transformer at each pump house which provides 110 volt circuits for lighting the pump houses.

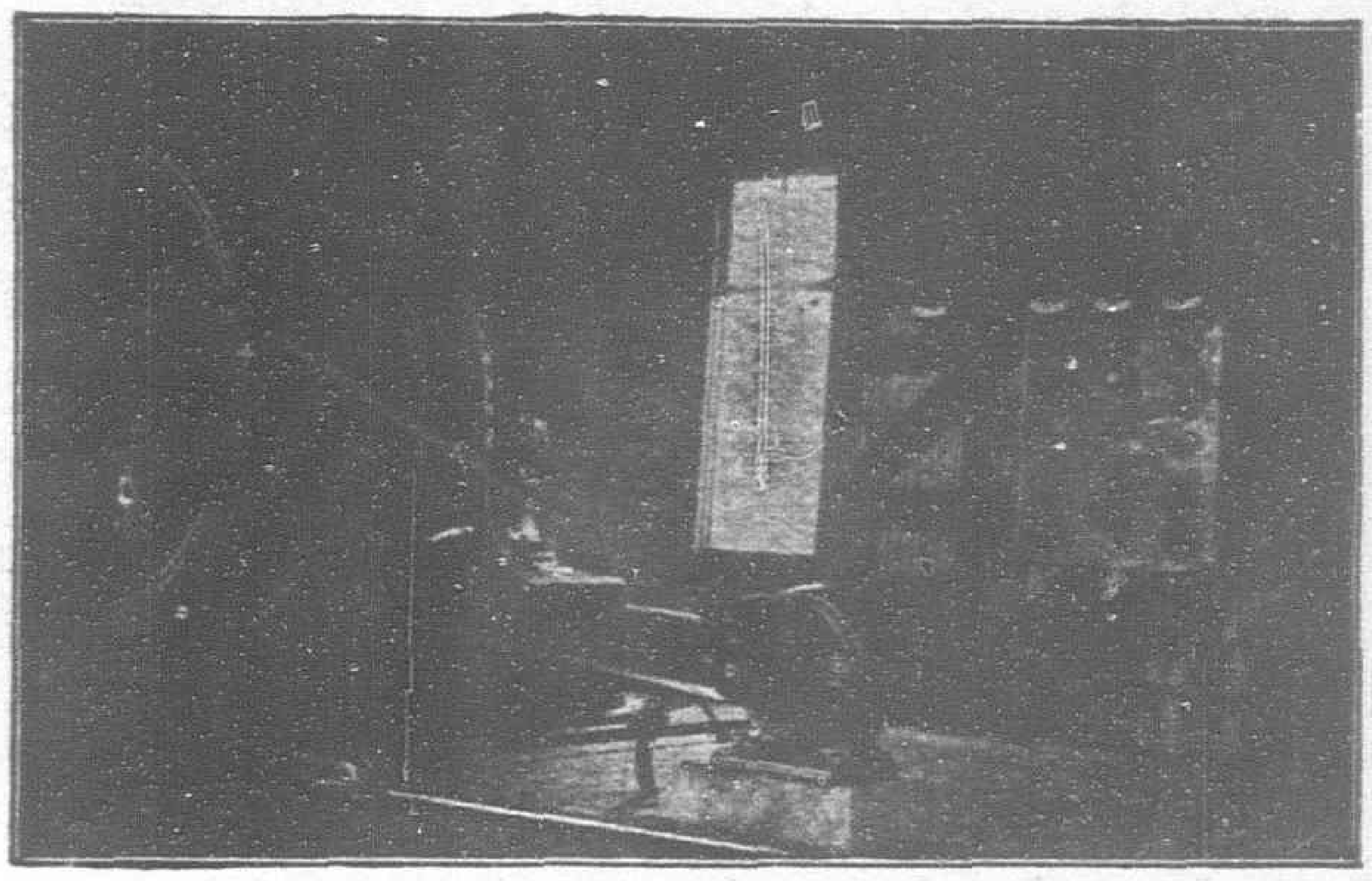






Each motor is connected by coupling to centrifugal pumps throwing 10 in. streams. The water stands in the wells from 40 to 60 ft. below the surface, each pump discharging from 3,000 to 4,000 gallons of water per minute. Each well supplies about 250 acres. The illustrations herewith show the generating unit, power house, transmission line, pumps and pump houses. The equipment was sold and installed by Fairbanks, Morse & Co., No. 608 Magazine St., New Orleans, La., and the installation has proven eminently successful in every way. Low grade oils from Louisiana and Texas Refineries operate the engine, and the economy shown has been considerably better than the manufacturer's claims.

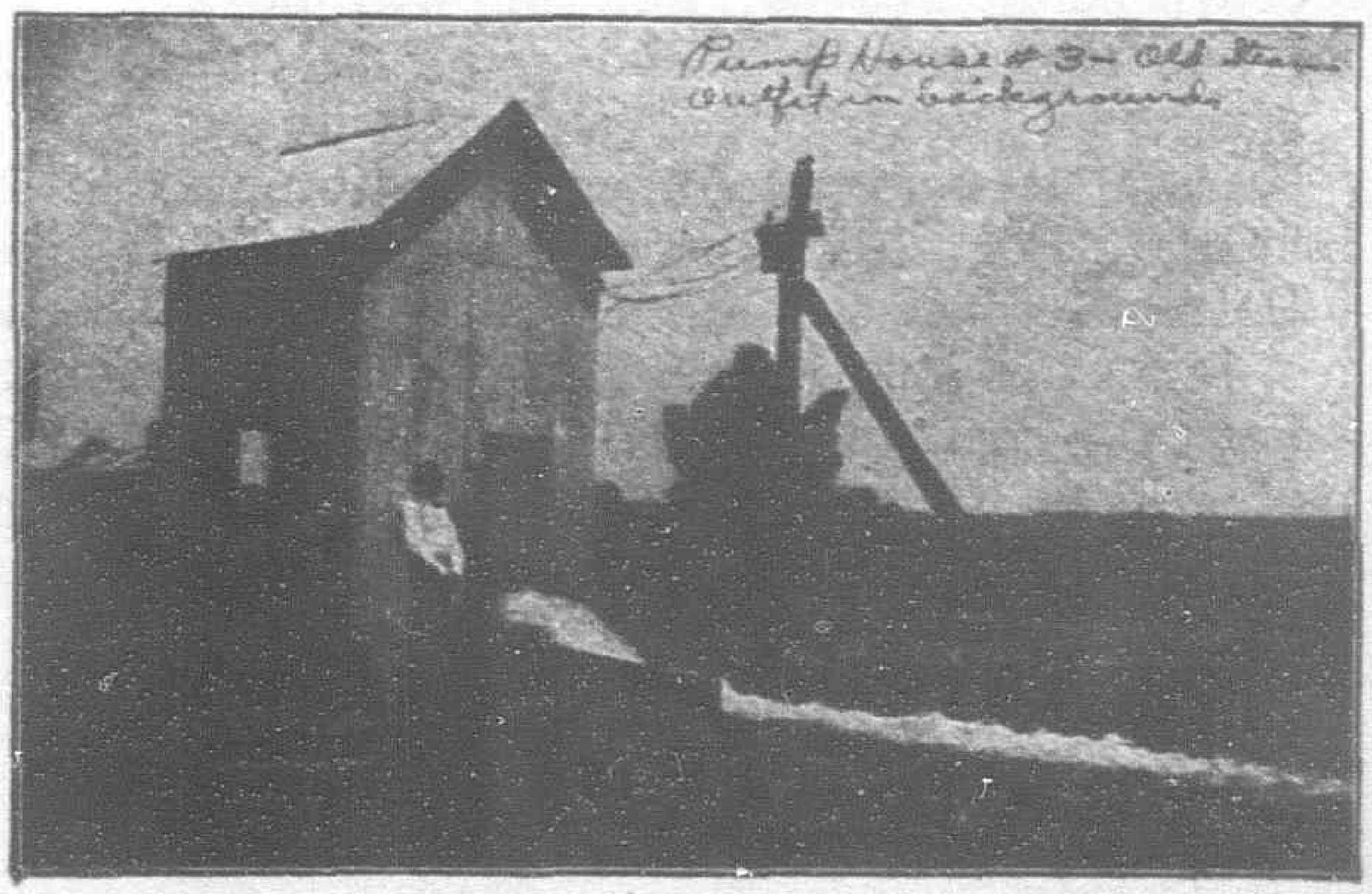
Provisions were made so that additional generating units, as well as motors and pumps can be added in future if wanted, without materially adding to the cost of attendance. The electrically driven pumps replaced steam driven outfits, which required at least one attendant at each pump. The present arrangement allows for locating the wells and pumps at the most convenient point for the rice fields flooded regardless of such conditions as good roads or easy access for coal transportation, etc.



SWITCH BOARD

The electrically driven pump fits into the rice irrigating problem very nicely, as a well that is pumped 65 to 75 twenty-four hour days per season has considerable sand and sediment drawn from it, and in a few years the pump and column sink and get out of line. A belted vertical pump is hard to keep in line under these conditions as the belt will not stay on when out of line while the electrically driven vertical pump with motor mounted on the frame overcomes this difficulty.

When a well ceases delivering water, a new one can be sunk nearby, and the pump and motor easily moved without having to move an engine, boiler and smokestack. Furthermore the operating of the pumps can be manipulated to suit the water supply, that is one pump can be stopped in one field and another started in another field, without additional prime mover capacity.



CHINA'S MILITARY ADVISER

The task of adviser on military affairs to the Chinese Government is, at this particular period, as onerous as any that could be placed upon the shoulders of any man desirous of seeing his advice followed and anxious to see the service he specialises in placed upon a business-like footing, efficient and worthy of a country aspiring to the dignity of a first-class power. Commandant Brissaud-Desmaillet has been honored with the difficult position, and if reputation goes for anything he is a man who will very quickly chafe under any exhibition of insincerity on the part of the Government, or any indication on the part of the Board of War which might tend to suggest that the appointment was made with the tongue in the cheek. If China needs advice in any department just at present it is in the department of War, and that significant fact Commandant Desmaillet well knows.

It would be idle, it would be futile, it would be folly to endeavor to gloss over the difficulties which stand in the way of reform in the army. The Revolution from which the country has just emerged has left the army in a state bordering upon chaos. It is split into factions, is controlled not by one but by many, is preening itself as being the arbiter of the country's destinies. It holds the country's rulers in the hollow of its hand, challenges the National and the Provincial Assemblies, and domineers over the Tutus (Governors-General) if any one of that grade does any act or suggests any move that might in any way infringe upon what the army prescribes as its special domain—and its domain extends into politics. The Revolution has left it powerful and peccable. Divided yet composite; internally torn by the jealous rights and privileges of individual cliques and coteries, yet ready to spring together upon the common foe who would trespass upon the ground over which it presumes to have and to hold the arbiter dicta. Its ranks are aflood with generals who are not generals, its files are crammed with a riff-raff dangerous in its ignorance of the *raison d'etre* of a soldier, menacing in its disregard of the fundamental needs of discipline. Particularly is this so in what is called "the South." The military organisation there is military disorganisation. The pseudo-soldiers are held in apparent quiet simply because they feel disposed to remain quiet, bribed by promises, or under the fear of the sword. No one dare say to-day that the army must do this or that, and insist upon the order being obeyed, and he will be a brave man who will endeavour at this period to take decided action to bring the scattered forces under one supreme head. For this reason Commandant Desmaillet has a thankless work ahead of him, a task in which he will need to have the constant service of all the tact of which he has the advantage, and all the knowledge of the Chinese of which he is credited with being possessed. His is the least attractive of the posts on the Advisery list if he hopes to accomplish something immediate and tangible. If he does not, and it is certain that such is not the case, it will be a sinecure.

COMMANDANT BRISSAUD-DESMAILLET

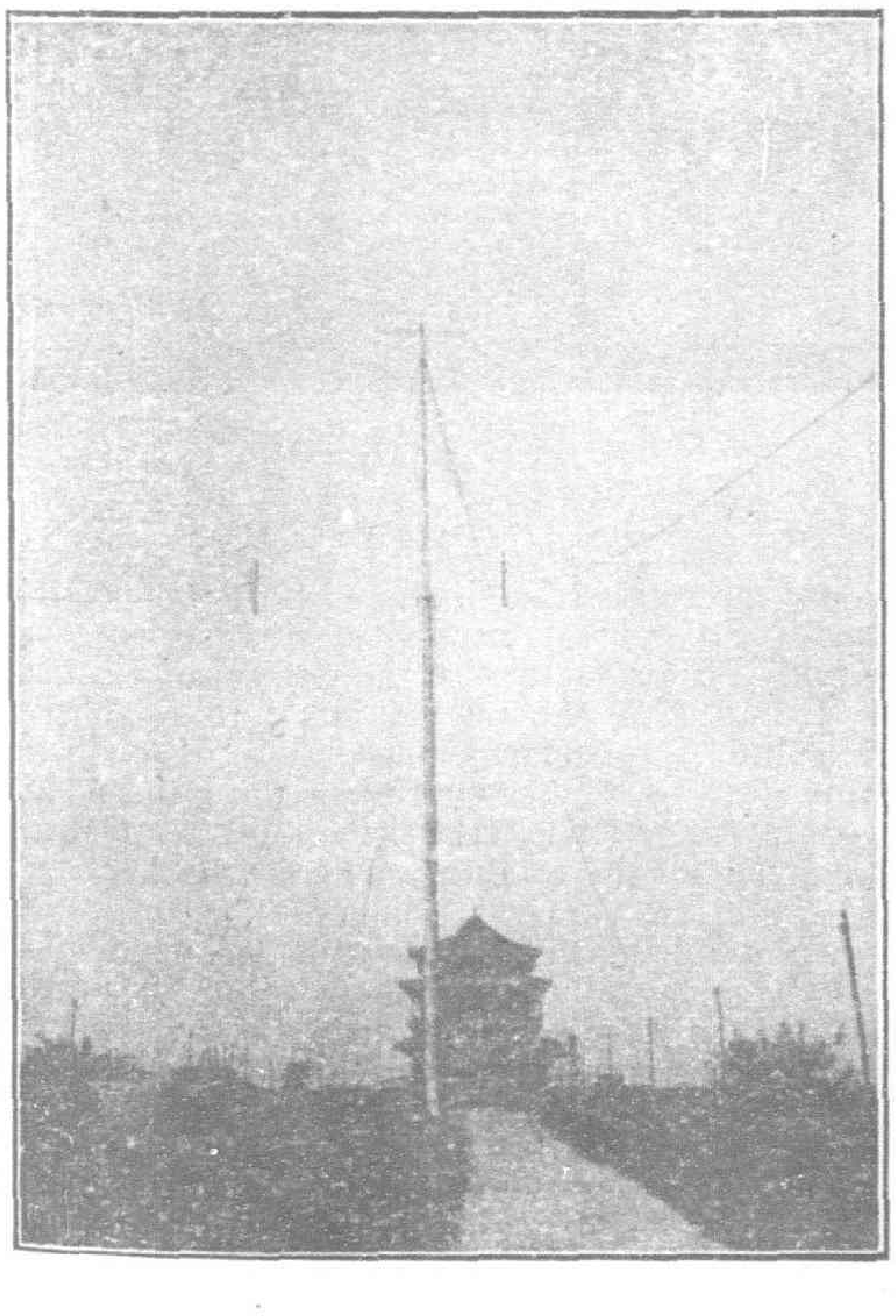
Though Commandant Desmaillet carries to his appointment a fund of valuable knowledge, his selection hinges upon the personal liking felt for him by President Yuan Shih-k'ai. During the period in which Yuan Shih-k'ai was in retirement in Honan he was frequently visited by the Commandant and he learnt to appreciate the manly qualities of the French officer. So much so is this the case that when other nationals endeavored to cause the rejection of the appointment upon its announcement the only reply vouchsafed their suggestions by the President was "Major Desmaillet is a lao-peng-yu,"—an old trusted friend. But whilst friendship had much to do with the appointment it is still a good one. The Commandant's duties in the service of France enabled him to acquire a valuable knowledge of European armies, and his publication on the tactical ideas of Germany and France between 1894 and 1911 is described as being of high merit and exceptional worth. In China he has travelled extensively, and knowing the conditions of the country and the character of the people he is able to apply his wider knowledge of the outer world to local problems. He has made a careful study of the various military systems of the world, and has evolved a most elaborate system of reform for China, a system which may be said to embrace the best features of the military organisation of various nations, with vigilant regard for the conditions peculiar to China and her people. The basis of his reform will be the retention of China's modern style troops, which he proposes to use as a nucleus, and the abolition of the old-style regiments.

Commandant Desmaillet was born at Carassonne, in the south of France, on January 16, 1869, and entered the military College at St. Cyr at the age of 18. Two years latter he secured his commission as sub-lieutenant. He was attached to the 14th battalion of Alpine Infantry, and being sent to Austria distinguished himself by making valuable investigations into the organisation of military affairs in that country. Whilst in Austria he followed his practical studies and made a thorough study of the archives of the Ministry of War in Vienna, where he was received and assisted by the highest officers in the Austrian army. In March 1897, he was raised to a captaincy, and placed in command of a Company in the 28th battalion of the Alpine Infantry. Eventually he went as special Adjutant to the staff of the Minister of War at Paris, and was placed in charge of the German and Austro-Hungarian departments at the war office. In June 1903, he was sent to Peking as Military Attaché, which post he held until 1910, when he was recalled to France. He was attached to the 5th Regiment of Infantry and later appointed special A.D.C. to the Minister of War, M. Messimy. Ultimately he was depatched to Tientsin in command of a battalion of the 16th Colonial Regiment, and on August 16 last was appointed Military Adviser to China for a period of three years. The Commandant is held in high esteem by his friends, and nations such as Austria, Spain, Italy, Japan, Korea and China have signified their appreciation by conferring decorations upon him. In addition he was created a Chevalier of the Legion of Honour of France.

FAR EASTERN WIRELESS INSTALLATIONS

AMERICAN INSTALLATION AT PEKING

The latest addition to wireless telegraphic installations in China is that which has just been erected for the American Legation at Peking. The mast has been placed upon the historic wall at the rear of the Legation and to the east of the famous Chien Men. The accompanying illustration shows the Gate in the background.

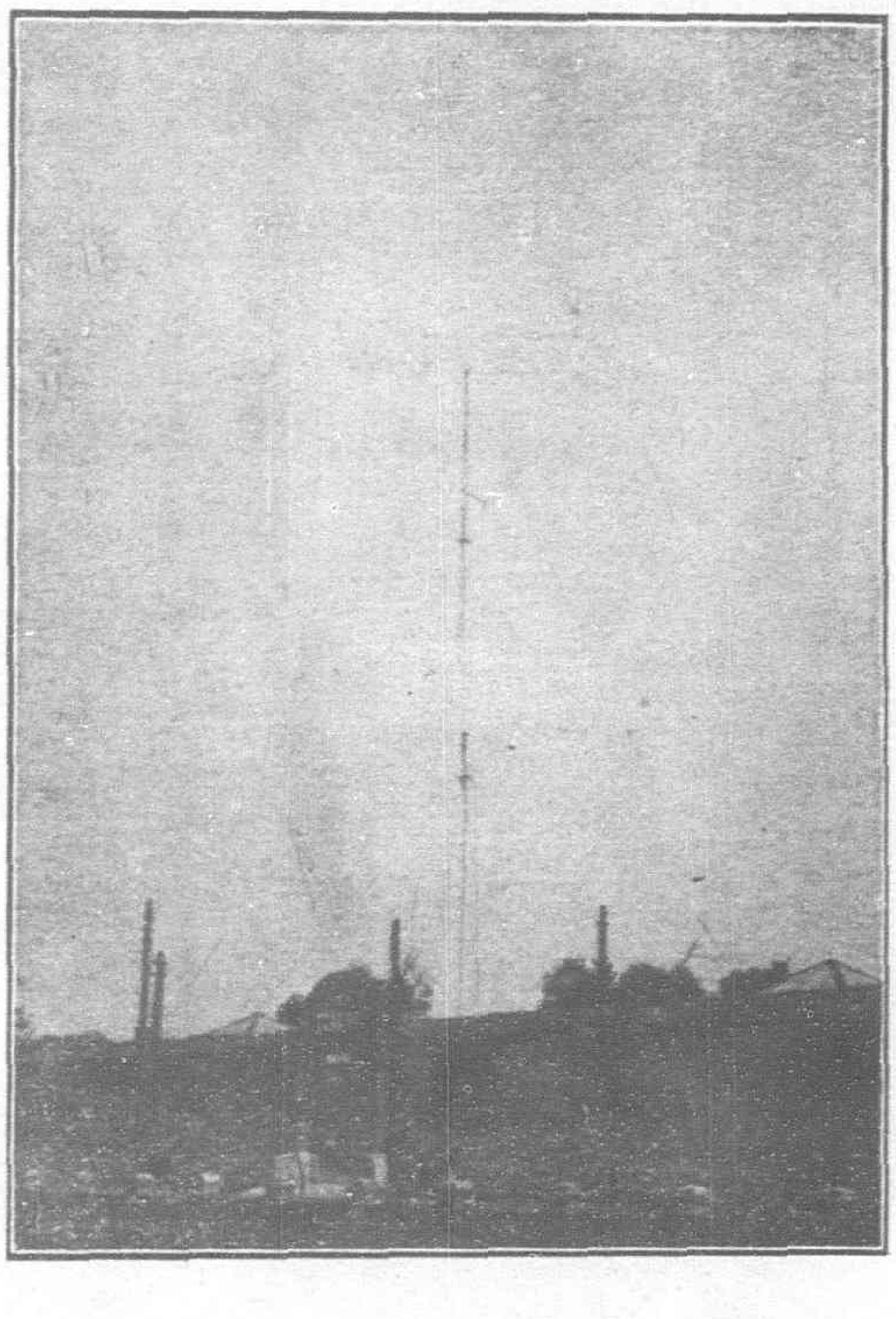


AMERICAN WIRELESS INSTALLATION ON THE PEKING WALL

The Fessenden system has been utilised (a navy plant having been installed) and the power is generated in the Legation compound. Shanghai is well within the ordinary working radius.

The mast is a single pole 129 feet in height, and, as the wall is 39 feet high, the truck is thus 168 feet above the level of the street. The piece of timber came from a Yalu River forest and is one of the longest poles that has ever been seen in the capital. The whole installation was effected by Navy Electrician J. W. Keever.

There are two other wireless installations in Peking, one being in the Italian Legation compound, and the other in the city, the latter belonging to the Chinese Government. The former is a 1900 type Marconi plant of one kilowat power, with a range as far as Tongku.



ITALIAN WIRELESS STATION IN LEGATION COMPOUND, PEKING

The mast (shown in the accompanying illustration) is 150 feet high. The Chinese Government station was erected by and equipped with the Telefunken Company's apparatus and is of five kilowat power. It was built to work with an identical station at Nanking, but as that was destroyed by General Chang Chun during the siege of Nanking in the recent Revolution, the Peking station is now closed for lack of a corresponding installation with which to operate. The plant has a radius of action at all times and under any conditions of 600 miles, but under favorable circumstances can communicate 2,000 miles. The masts are 200 feet high.

HONGKONG AND WIRELESS

At a recent meeting of the Legislative Council at Hongkong a formal protest was made against the postponement by the Imperial Government of the erection of a wireless station. Mr. H. E. Pollock, in bringing the matter up for consideration contended, that instead of delaying the establishment of a station the Imperial Government should hasten it in view of the part that statistics proved Hongkong to be the largest shipping port in the world. He considered the station should be completed simultaneously with the one at Singapore and in order to give emphasis to the feeling of the community he moved "That this Council has read with pleasure the statement of the Postmaster-General, made in the House of Commons, on the 7th of August, 1912, to the effect that it is the intention of the British Government to erect, at its own cost, a £60,000 Wireless Telegraph Station in Hongkong and that such Station is to be used for the transmission of commercial cables, but that the Council regrets to learn from the statement that the erection of such a Station is to be postponed till a later date, and that this Council begs to most respectfully urge upon the British Government the desirability of such a Station being erected in Hongkong at the same time as the Singapore Station." Mr. C. H. Ross seconded the motion and made it plain that lack of enterprise was not due to the commercial community. As however, they were already lagging behind Japan, the Philippines and even parts of the neighbouring Republic of China, and were entirely dependent in the matter of wireless communication on the good offices of His Majesty's ships when they happened to be in port, he thought the Council should strongly urge that the provision of the station should be no longer delayed.

The Governor (Sir Francis May) said that the Government had no information about the scheme, and all he could do would be to ask the Imperial Government for information and forward the resolution, together with the speeches of hon. members, and to say that they were very desirous that Hongkong should not be left out of the scheme. The Government could not accept the resolution, he explained, and it was later withdrawn.

At the same meeting in the Governor's review of the Budget, mention was made of the fact that a sum of $100,000 had been provided for a radio-telegraphic installation. As at present advised, the Government considered that all that was necessary was a station for ship to shore communication with a range of not less than 600 miles under favorable conditions.

His Excellency said he knew that a much more powerful station had been suggested. But he would remind the Council that a high power station for strategic purposes was the concern of His Majesty's Government; that a medium power station for purposes of communication with land stations in competition with the Cable Companies was really a separate proposal; and that what the Port really required was the means of ship to shore communications. As ships carry only installations of limited range, it did not seem necessary to do more than to provide at station capable of ensuring communication with ships, making due allowance for possible increase in range of the latter's installations. He had asked the Secretary of State for advice as to what, in these circumstances the nature of the installation in Hongkong should be, and he would inform the Council in due course of the result.

GERMAN STEAMER INSTALLATIONS

The North-German Lloyd of Bremen announces an important extension of the wireless news service to their steamers on the Far Eastern lines, says the *North-China Daily News*. Up to now it has only been possible for these to receive important news on the western side of Port Said, as the power of the wireless station in Germany only reached to that distance, and for any further news the vessels could only depend on other ships. Now, however, that the necessary wireless apparatus has been erected in Tsingtao, the direction of the *Ostasiatische Lloyd*, a Shanghai journal, the North-German Lloyd and the Deutschen Betriebsgesellschaft für Drahtlose Telegraphie, have come to an arrangement with the Government in Tsingtao by which telegrams will be despatched to the German company's ships twice daily, namely, at 2.30 and 11 p.m. (Chinese coastal time). The wireless telegrams will immediately, on receipt, be posted up in the vessels for the information of passengers.

Suragoa Gold Fields.—Mr. E. O. Parker, who is looking after the interests of the Suragoa Gold Mining Co. is sanguine of the success of the venture. The sluicing equipment at the mine has more than justified the investment. A large hydraulic plant has been ordered from the States.

THE PHILIPPINE GENERAL HOSPITAL

In the year 1900, prior to the establishment of the Civil Government in the Philippine Islands, and shortly after the arrival on the ground of the Second Philippine Commission, commonly known as the "Taft Commission," Dean C. Worcester, who was then a member of the Commission and who had held the position of Secretary of the Interior since the establishment of the Executive Departments of the Insular Government, formulated a plan for the establishment in Manila of Central Government laboratories for the performance of routine work and original scientific research, of a medical college, and of a General Hospital, all to be located as near each other as practicable, upon a lot large enough to provide for all probable future expansion, the three institutions to be so interrelated that the Government laboratories might do routine work for the hospital and at the same time carry on original research relative to the causation and relief of disease, utilizing for the latter purpose material furnished by the hospital; that the laboratory staff might be available for teaching in the medical school and for service in the hospital; that the students of the medical school might have abundant opportunity for practical instruction in the hospital wards and clinics; and that the members of the teaching staff of the medical college might have opportunity not only to aid in the hospital work but to carry on their own original investigations in the laboratory.

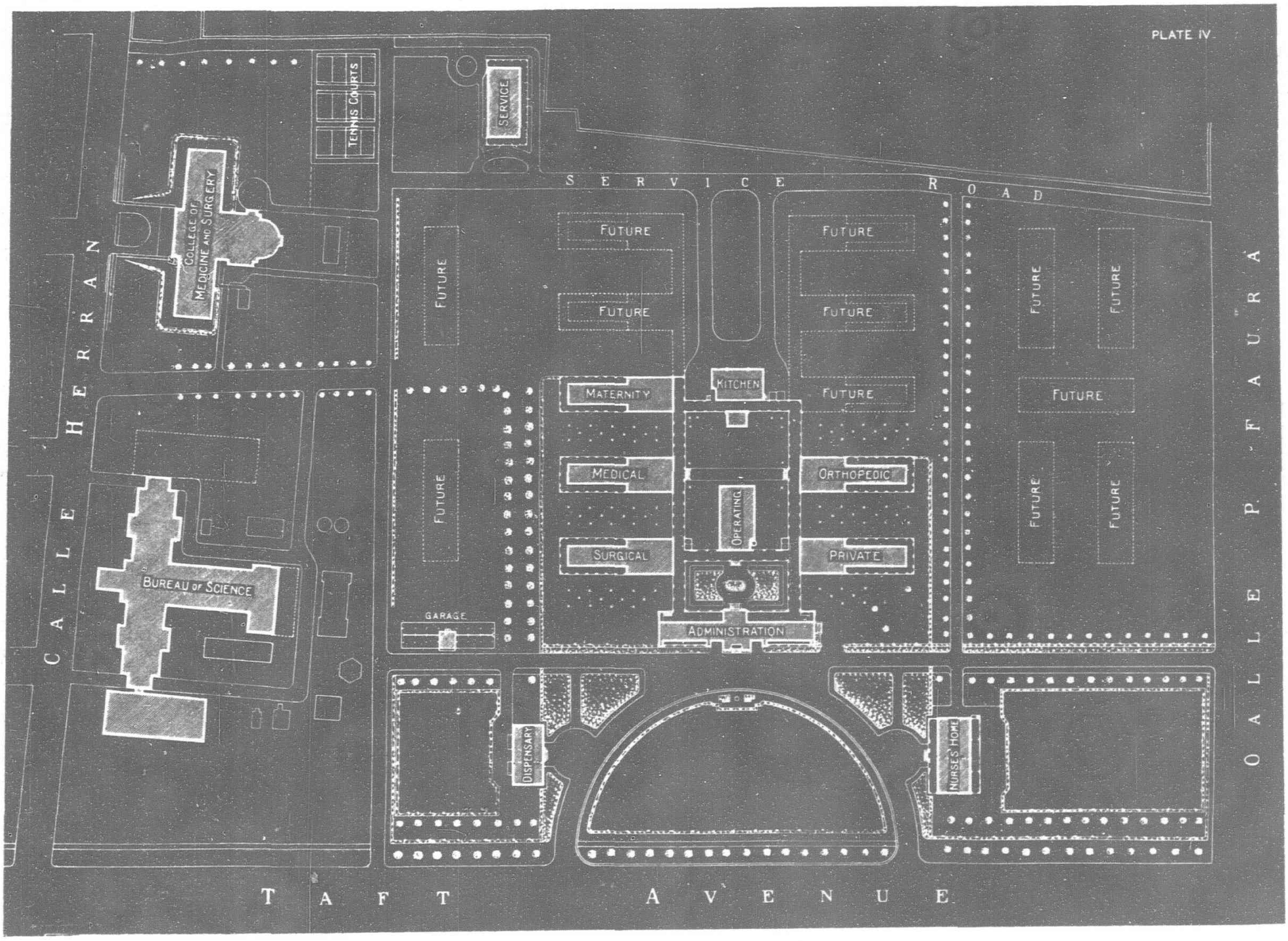
The realization of this project seemed so improbable that its originator was called "crazy," while the plan itself was commonly designated as "Worcester's dream." The first step toward its realization was taken when the Bureau of Government Laboratories was established on July 1, 1901, by the passage of an act which provided for the centralization of all the biological and chemical work of the Insular Government. A further and great advance was made when the Philippine Bureau of Science, into which the Bureau of Government Laboratories ultimately developed, occupied the carefully planned and well equipped laboratory building constructed for its special use. This building was erected on the so-called Exposition Grounds which afforded a conveniently situated site of sufficient size to accommodate all of the buildings needful for a medical school and for a hospital of a thousand or more beds, but at the outset other plans were entertained relative to the future of that portion of the land in this tract not needed by the Bureau of Science, and it was only after a long and determined contest that its reservation for a hospital and a medical school was secured. Then followed the establishment of the medical school itself, which was provided for by a law enacted on December 1, 1905. The school was at first, of necessity, given temporary quarters pending the construction of a suitable home for it. The medical school building, which stands on the Exposition Grounds immediately to the west of the building of the Bureau of Science, was occupied on June 1, 1910.

The completion and occupation of the splendid group of reinforced concrete buildings which now constitute the Philippine General Hospital marked the full realization of "Worcester's dream."

Immediately after the arrival of the American army in the Islands military hospitals were established in Manila. The military medical corps extended the courtesies of the army hospitals to civilians when it was possible to do so but, of necessity, this service was highly unsatisfactory to the citizens of Manila.

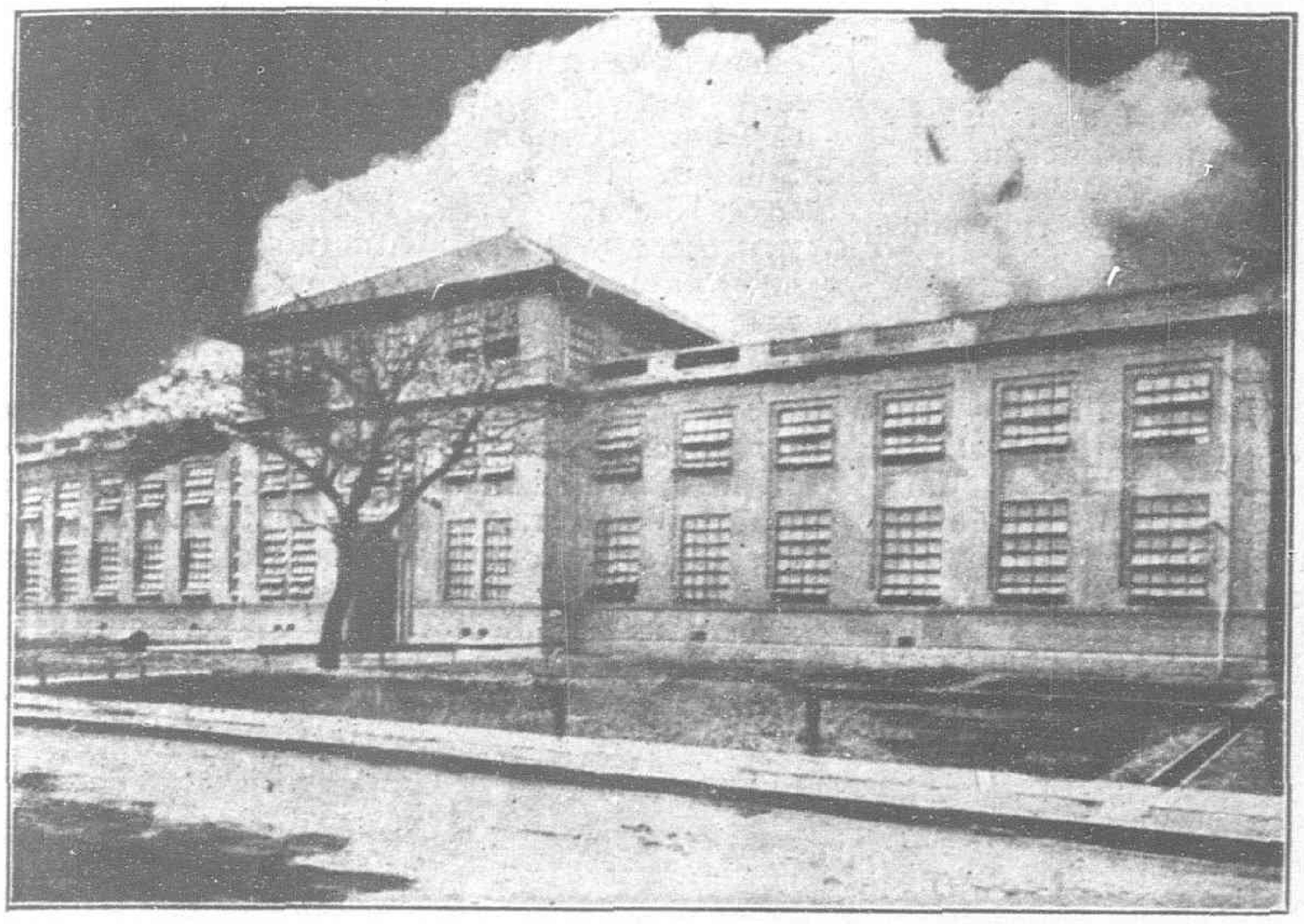
In spite of the efforts made to establish a hospital for the accommodation of civilians, this state of affairs continued until the month of March, 1901, when the situation was somewhat relieved by the establishment of the Women's Hospital at 350 Gral. Solano. This institution was intended, primarily, for the accommodation of women and children only, but in urgent cases men were admitted also.

A short time after this an agreement was reached between the hospital authorities and the Government officials, whereby Civil Government employees were to be given medical and surgical attendance in this institution, but, unfortunately, it was soon discovered that the facilities here were inadequate to meet the demands of the situation; moreover, the American population was rapidly increasing,

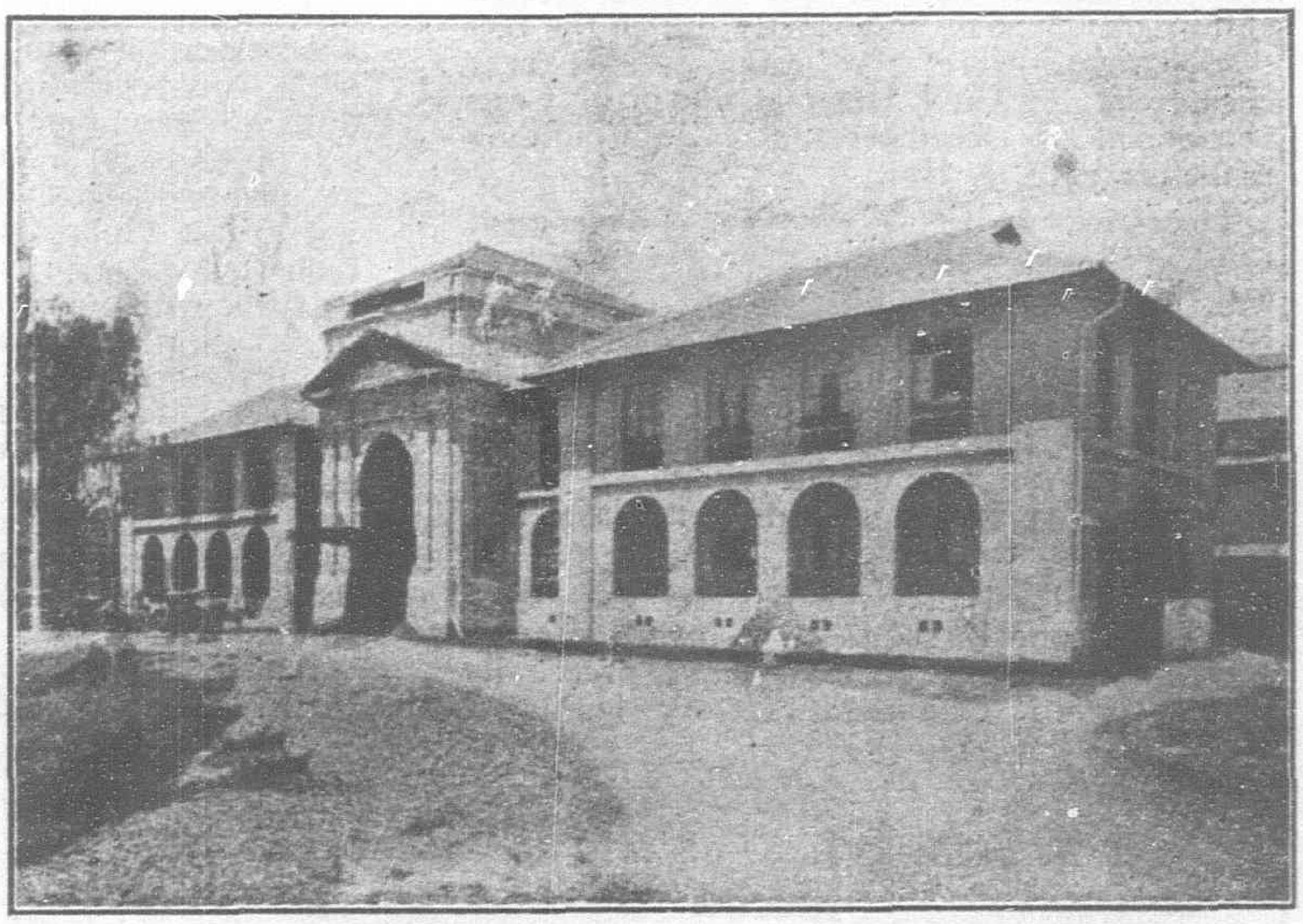


GROUND PLAN OF THE PHILIPPINE GENERAL HOSPITAL which made it imperative that other accommodations be provided.

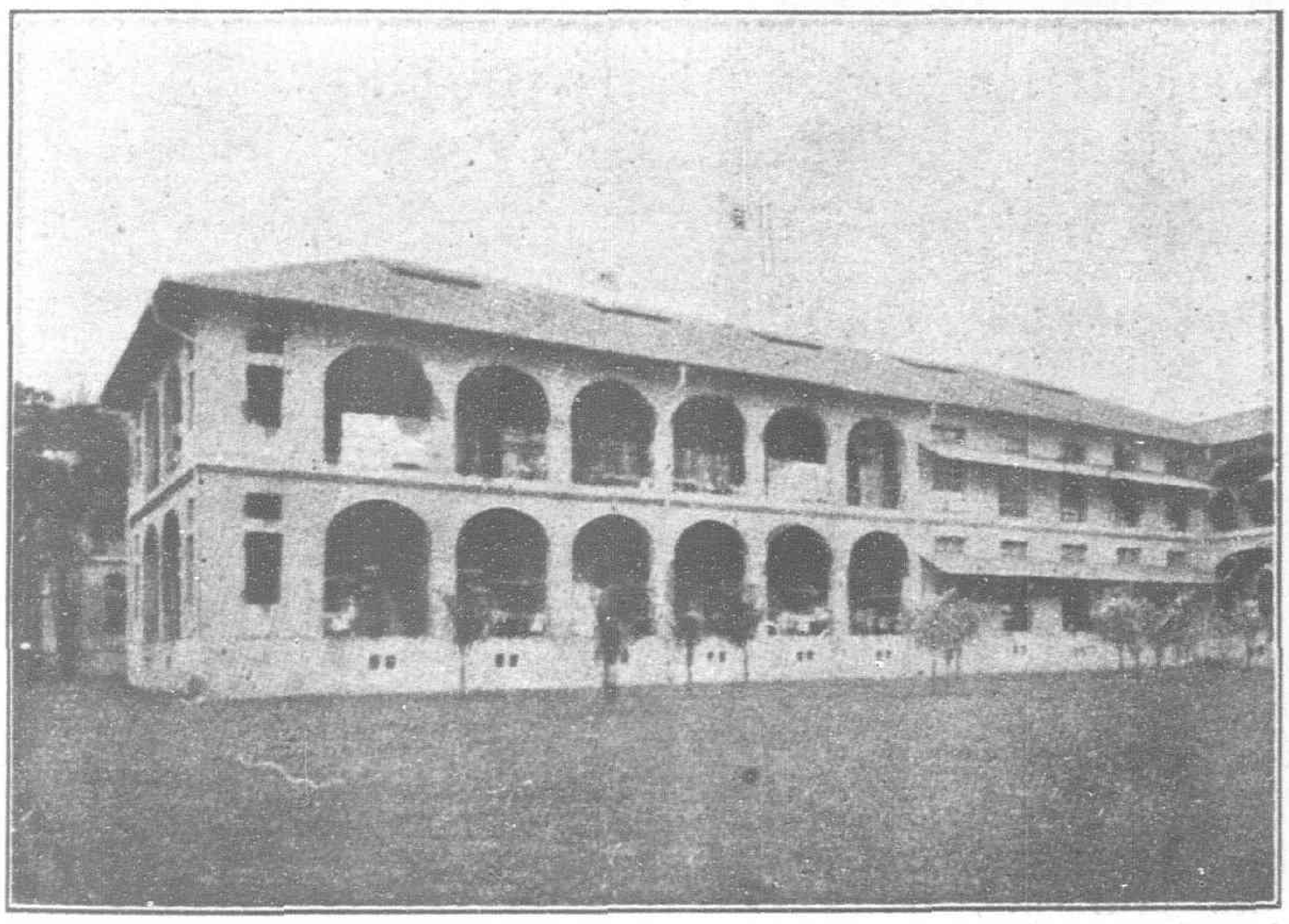
The first step toward relieving the situation was taken on August 6, 1901, when the Philippine Commission, by the passage of Act No. 189, made it incumbent upon the Civil Government to render medical assistance to its employees and their families. This provision was followed, on October 1, 1901, by the passage of Act No. 247, which established the Philippine Civil Hospital. The need for the hospital was so great that the necessary equipment was quickly procured and the institution opened within the month, in a part of the buildings on Calle Iris in which it was located



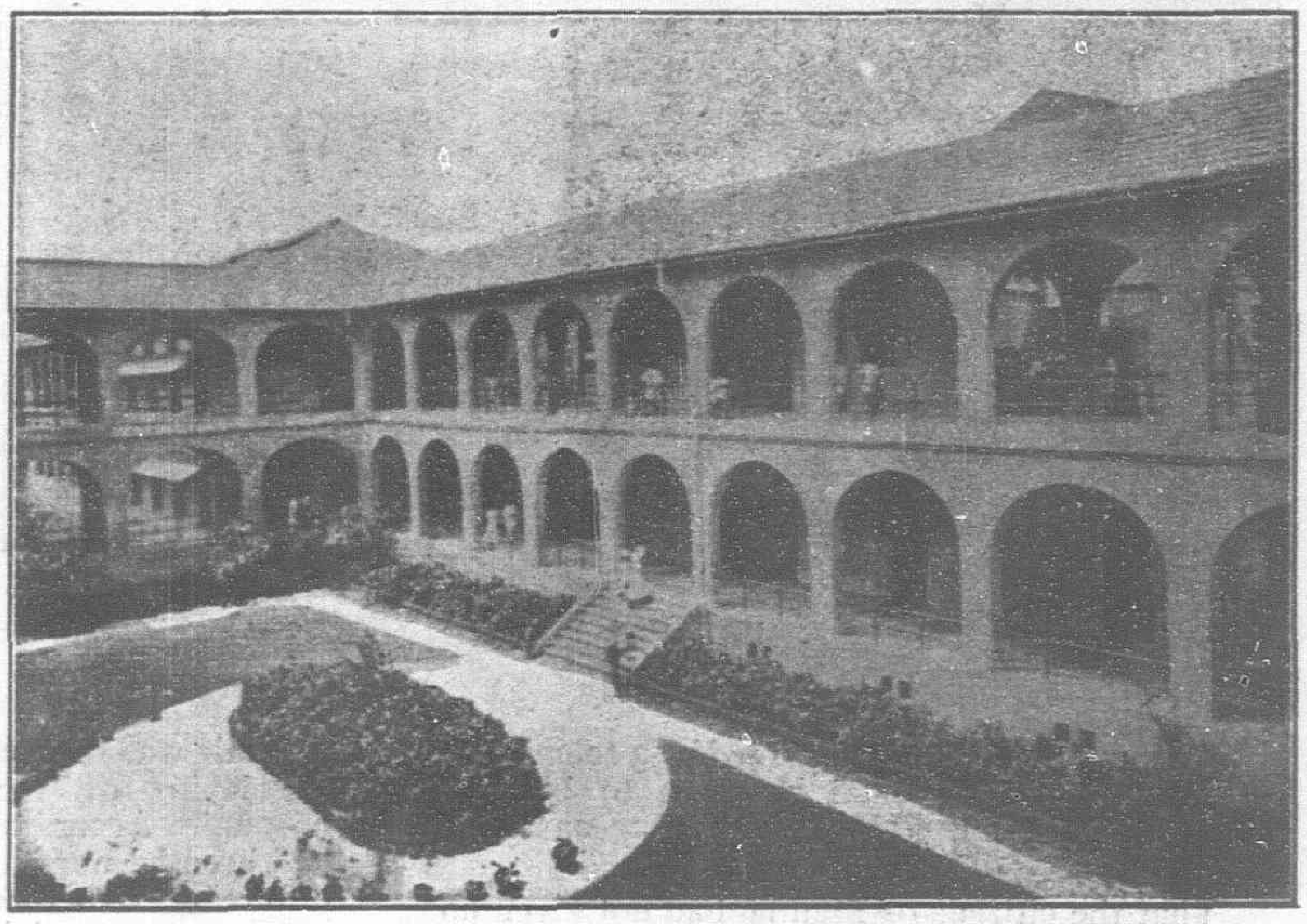
COLLEGE OF MEDICINE AND SURGERY



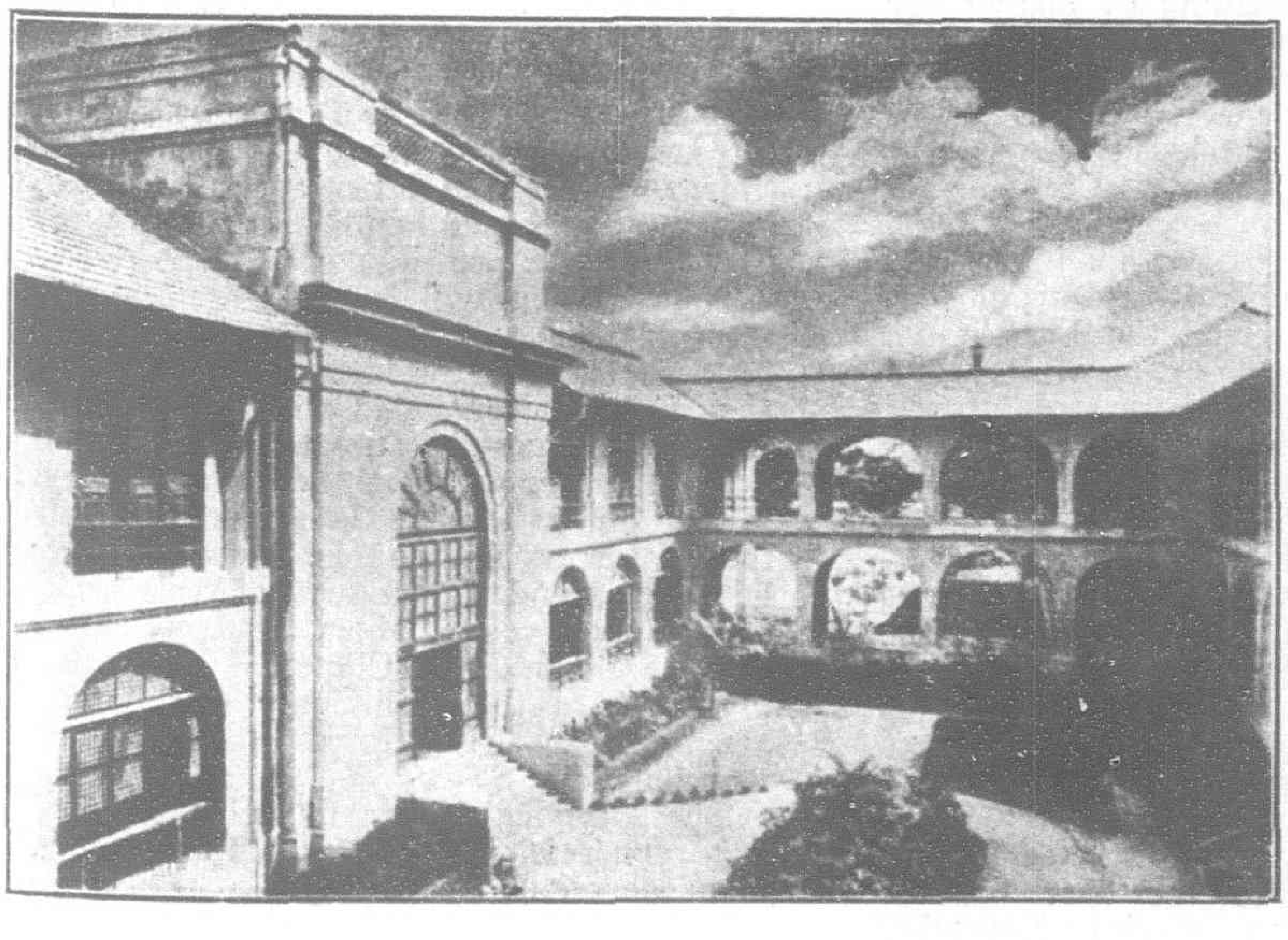
ADMINISTRATION BUILDING



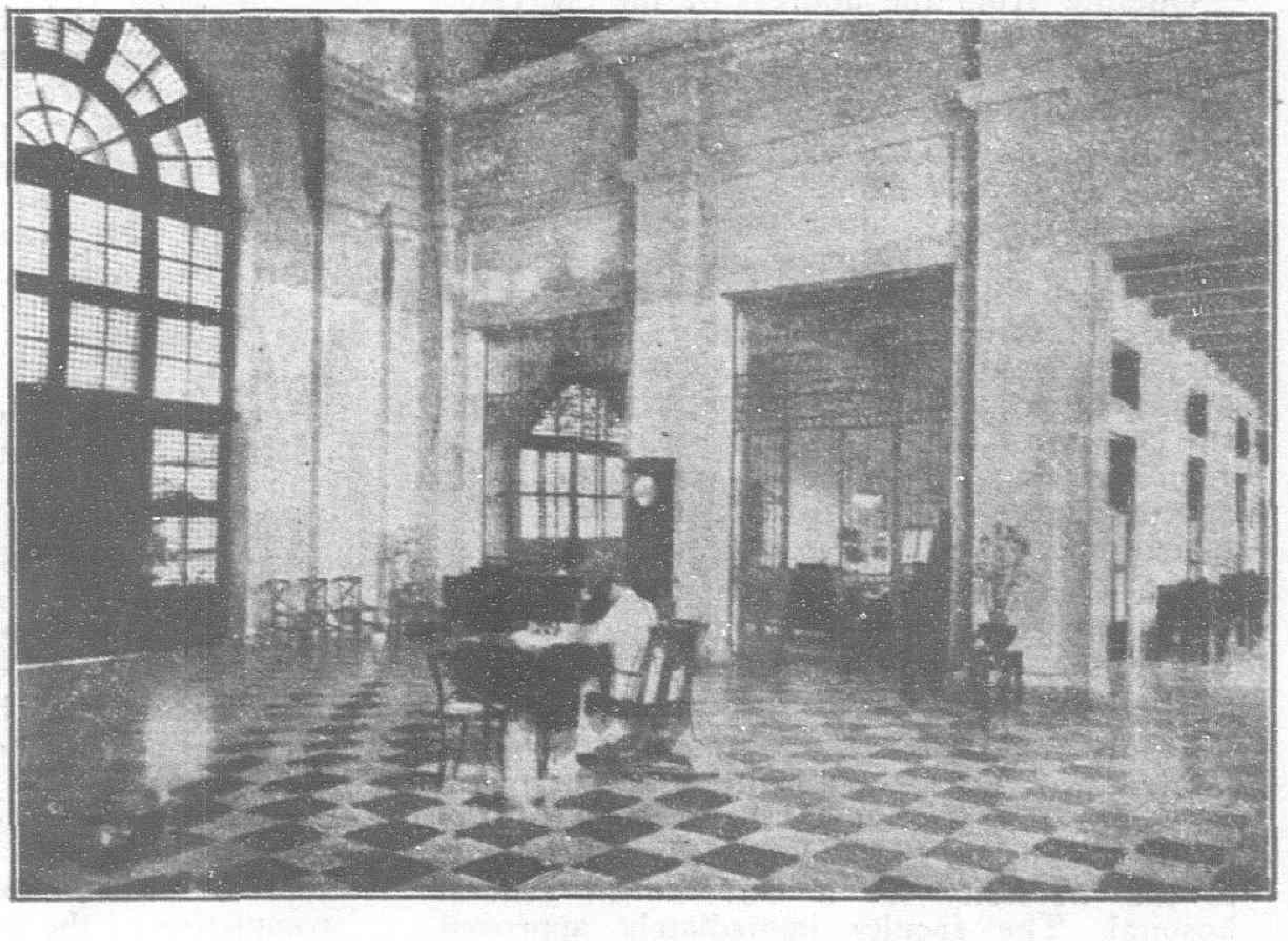
SURGICAL PAVILION



COURT AND CORRIDORS



COURT FACING FRONT OF ADMINISTRATION PAVILION



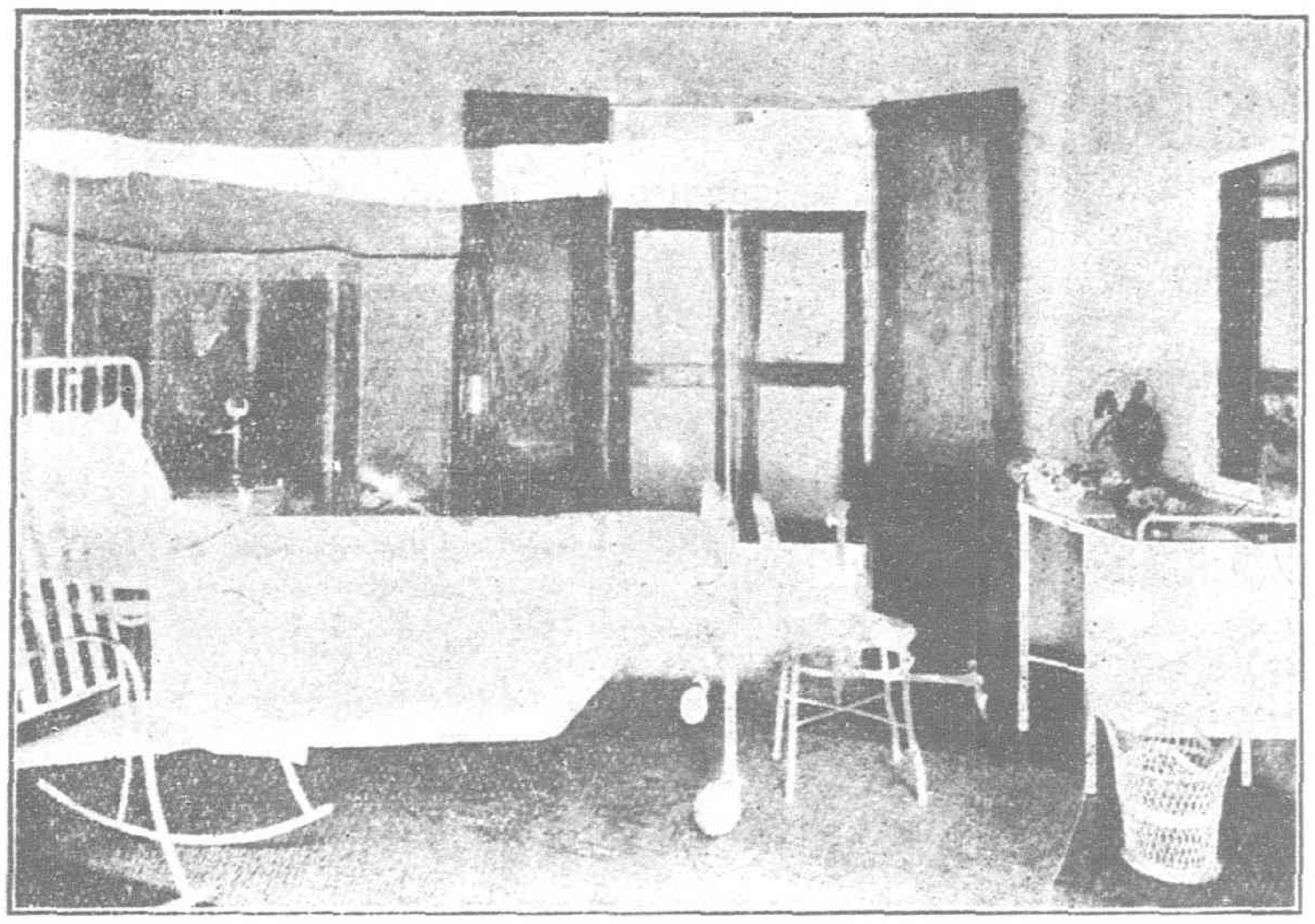
VESTIBULE, ADMINISTRATION BUILDING

at the time it was abolished on the opening of the General Hospital in 1910.

In the meantime the Women's Hospital had been merged with the Cosmopolitan Hospital for which subscriptions had been raised and a building erected. Elaborate plans were made for expansion but at the critical period enthusiasm waned, and, partly due to the fact that patients were now being treated very cheaply at the Civil Hospital, the project was abandoned in December 1902. This building is the present City Hall.

The Civil Hospital rate for Government employees was placed at P2 per day for wards and P5 for private rooms, (one peso, P, is equal to 50 cents U. S. currency) and accommodations were furnished at P3 per day for wards and P6 for private rooms to those not in the employ of the Government. It cost the Government an average of about P8.50 per person per day for all patients for subsistence, quarters, and attendance.

It was realized that the hospital was badly located and poorly suited to its needs in many ways, but at this time it was practically impossible to obtain satisfactory buildings. Then again it was only intended as a temporary location, as the original intention to build a large general hospital had by no means been abandoned.



PRIVATE ROOM

FEMALE WARD

That the citizens of Manila had not given up the idea and that the question was to them a very live one was evinced by a petition to the Governor and Commission in the early part of 1903.

Quoting from the address of the Secretary of the Interior upon the occasion of the laying of the cornerstone we find the history of the formative period of the hospital related as follows:

As rapidly as possible Mr. W. E. Parsons, the Consulting Architect to the Commission, prepared preliminary plans and estimates, and prior to the departure of the Secretary of the Interior for the United States in October 1906, they were transmitted to the Commission with an urgent request from that official and from the Director of Health that the necessary funds for carrying them out be immediately appropriated and the construction work inaugurated as soon as possible.

Other counsels prevailed, however, and the whole project was laid on the table where it was found peacefully reposing by the Secretary of the Interior on his return in April, 1907.

Before making final recommendation to the Commission, he deemed it fitting and desirable to secure the opinion of the faculty of the newly established Philippine Medical School as to the necessity for a Government general hospital. The faculty immediately approved the project but objected to the small number of beds planned for at the ouset, insisting that 300 should be provided for instead of 200 proposed. The arguments which they brought forward in favor of this course seemed unanswerable, and the Director of Health and the Secretary of the Interior united in requesting the Commission to appropriate the sum of P780,000 in order to make possible the erection of a central administration building, a surgical pavilion with two operating rooms, a building for dispensary and outclinic, five ward pavilions of sixty beds each, a nurses' home, a kitchen, an ambulance stable, and morgue. By unanimous vote of the Philippine Commission the full sum requested was appropriated.

It was with a profound sense of gratification that those who had labored so long and earnestly for the completion of the project finally saw a chance for the realization of their hopes. With the necessary funds available the greatest obstacle had been swept away, although the real, active, hard work remained to be done as there were a multitude of details to be thought out and unforeseen complications arose continually.

A meeting of the Philippine Islands Medical Society was to held in Manila early in 1908 and this was deemed an opportune occasion of the laying of the cornerstone of the new hospital. Accordingly, although no contracts had been let nor had the exact locations of the different structures been determined, the cornerstone was laid February 28, 1908.

The herculean task of perfecting plans and specifications for the different structures, in order to have them adapted to their purpose and at the same time be covered by the appropriation and the deciding of many other details consumed considerable time so that bids were not advertised for until June 24, 1908. When the bids were opened on July 27, it was found that the lowest bid had been made by H. Thurber, of the Manila Construction Company. He was accordingly awarded the contract for the erection of the administration, medical, surgical, maternity, private, orthopedic, and operating pavilions and the kitchen, on September 8, 1908 for the sum of P530,804. His contract specified that these structures be of reinforced concrete and that they be completed within 240 working days. The plumbing, wiring, filling, and a few other minor details were not included in this bid.

Actual construction work was begun shortly after the awarding of the contract but the usual number of vexatious delays occurred, conferences were held and changes in plans made until it became evident that the buildings would not be completed within the specified time. The contractor asked for and received two extensions on the time contracted for, the sum of which extended the date for the completion of the structural work to November 30, 1909.

After the structures were erected the process of finishing the interior and obtaining and installing equipment necessitated several months so that the opening of the institution was deferred to a much later date than was originally intended.

As previously stated, the long looked and hoped for day arrived and the hospital was officially opened on September 1, 1910, and a largely attended public reception was held in the hospital in honor of the event. On the following day ten patients were transferred from the old Civil Hospital to the new structure; coincident with this act the former institution passed into oblivion after more than nine years of useful, if somewhat turbulent, existence.

The new hospital is situated nearly in the center of a tract of land bounded by Calle Padre Faura on the north, Taft Avenue on the east, Calle Herran on the south, and the weather observatory grounds on the west. This tract contains nearly 11 hectares (27 acres) and is known as "Medical Center' on account of the Bureau of Science and the College of Medicine and Surgery being located on the same plot. (See block plan). It is most conveniently located, being well within the city limits and accessible by two trolley lines.

New Germinal Tobacco Factory:—On September first the Germinal Cigar and Cigarette Factory, will begin the construction of the largest contrete building yet planned for Manila.

The new building will be located on 3,500 meters of land which lies alongside of the present factory building, and has a frontage of 35.5 meters. It will be four stories high and fitted with electric elevators, overhead electric conveyors, and all other appliances that will increase the speed, and lessen the cost, of handling large quantities of tobacco.

The building will be used entirely for the manufacture of cigars and cigarettes and will be modeled and fitted after the very latest factories in Germany, Cuba and the United States. The cost is estimated at P. 140,000.

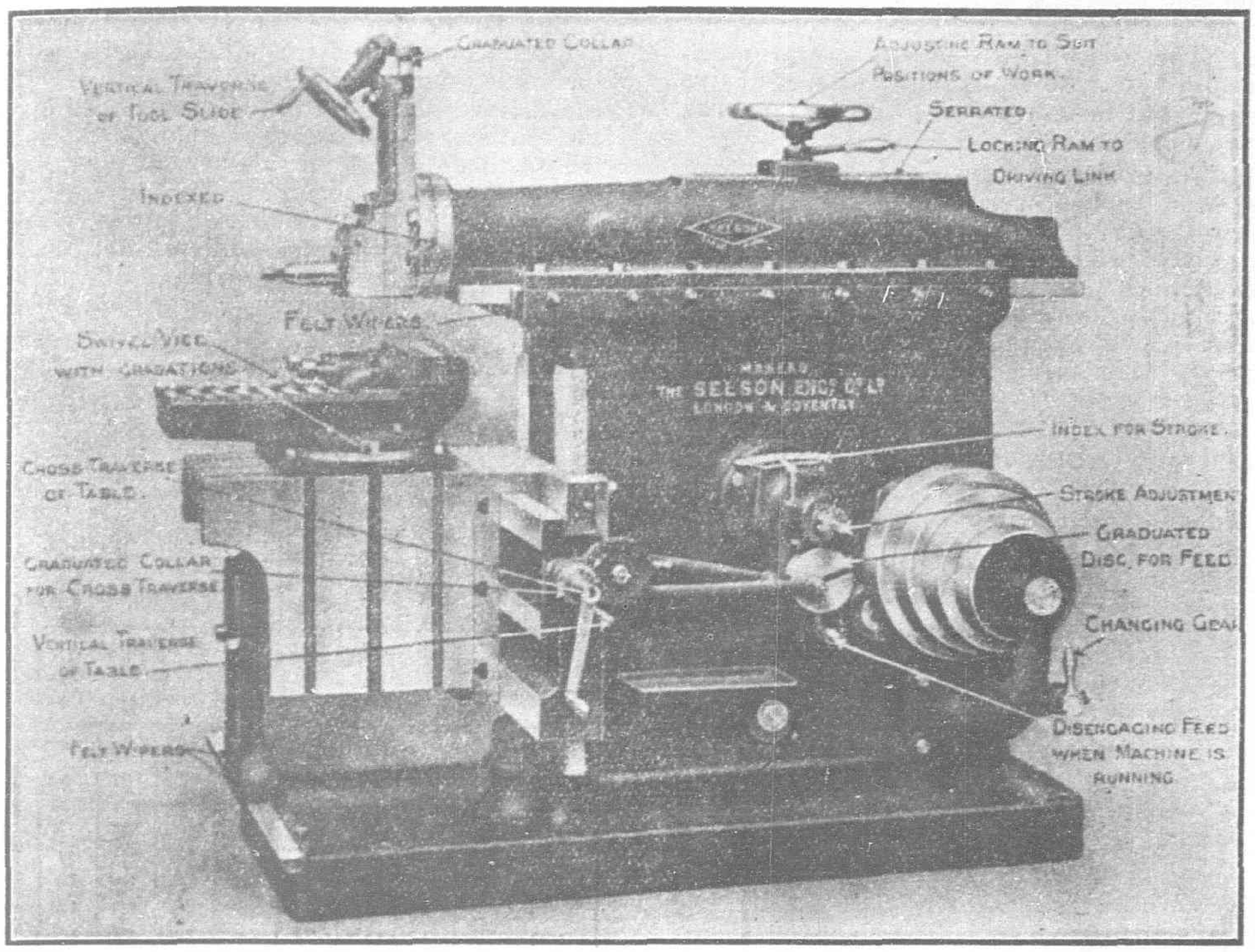
If the present plans of the company are carried out, as soon as the factory is completed, the old factory will be torn down and the new building extended over to the Ayala bridge at an additional cost of about P150,000.

Mr. Delmar Smith-Clinton is the contractor in charge of the preliminary work, and piles are now being driven for the foundation of the new building.

The Germinal Company will also build a new concrete factory at Malabon for the manufacture of cigars only.

Bids for the new factories have not been awarded, but will probably be let soon.

SELSON MACHINE TOOLS



Graduated Collar
Vertical Traverse of Tool Slide
Adjusting Ram to Suit Positions of Work.
Serrated.
Locking Ram to Driving Link
Indexed
Felt Wipers
Swivel Vice with Graduations
Maker
The Selson Eng. Co. Ld
London & Coventry
Index for Stroke.
Cross Traverse of Table.
Stroke Adjustmen
Graduated Disc. for Feed
Graduated Collar for Cross Traverse
Changing Gea
Vertical Traverse of Table.
Disengaging Feed when Machine is running
Felt Wipers

25 AND 30 IN. DOUBLE-GEARED SHAPERS

The Selson Engineering Co. Ltd., of 85, Queen Victoria Street, London, have recently published a new and very complete catalogue (a copy of which is at the disposal of prospective buyers), of their well-known Selson Shaping Machines which are made in two patterns, (Standard and Special) and six sizes, viz.: from 10″-30″ stroke. The Special pattern differs from the Standard in having a traversing head and traversing bottom table, the ordinary table being hinged so that it can be swung aside, and will thus accommodate large and heavy pieces and will do work hitherto done on the Planer.

DESCRIPTION.

General Construction.—The machines have been built for heavy cutting and to run at high speeds, although, owing to the high range of speeds, any practical cutting speed for such different materials as brass and hard die-steel can be obtained for any length of stroke. As improvements are constantly being made the illustrations and weights given, although correct in the main, cannot be considered binding.

Main Frame is a box casting, strongly ribbed and provided with a door, for easy access to the main driving link and driving gears. It is cut away directly underneath the ram, in order to admit long shafts for the purpose of keyseating.

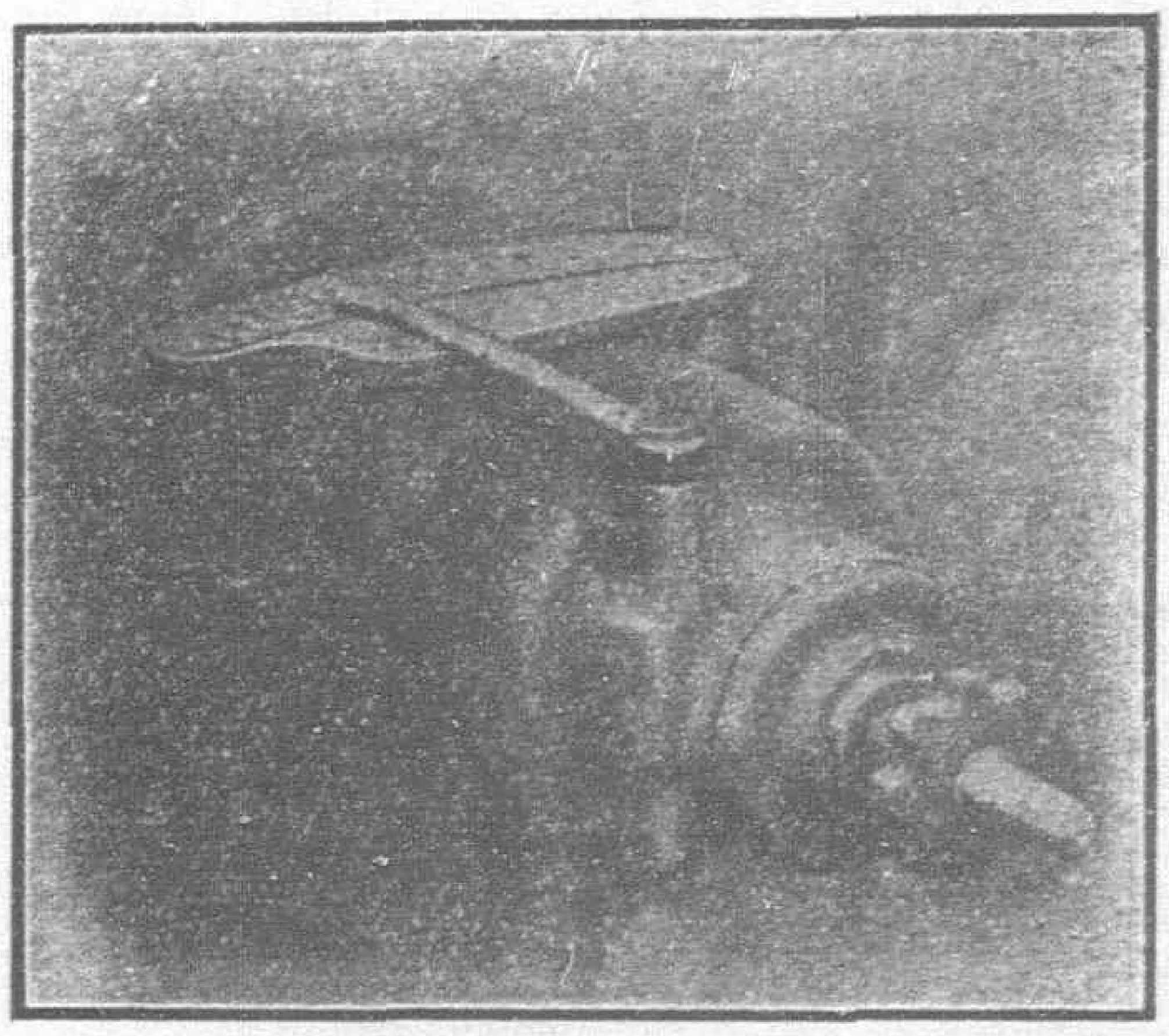
Base Plate, which is firmly secured to the main frame by turned bolts and lock nuts, is extended well to the front to give steadiness to the machine when working and to carry the table support. It is dished to form a trough to catch the waste lubricant and cuttings and prevent them from collecting on the floor of the shop.

The Ram is of arched form, strongly ribbed and carefully proportioned to give ample strength and rigidity without undue or excessive weight. The bearing surfaces are wide and run in square guides, which are provided with felt wipers to keep them clear of dirt and cuttings; there is also ample provision for taking up the wear of the sliding parts. The adjustment is quickly effected by a hand wheel **placed on the same centre as the locking handle,** making a compact, handy, and time saving arrangement. The top of the ram and locking plate are serrated, to prevent any possibility of slip under the heaviest cut.

The Tool Head is arranged to swivel through a complete circle and graduated in degrees, so that it can be set immediately to any angle. It is locked in place by a hand lever and gripping pad in the 10 in.-13 in. and 17 in. sizes, but, in the larger machines, where the heaviest cuts are taken and strength is of the first consideration, strong bolts are used. The tool slide is adjusted vertically by hand wheel which, on the 25 in. and 30 in. sizes, is brought well below the top of the slide and connected to the screw by angular shaft and bevel wheels, as illustrated above, for ease of manipulation. The screw is provided with a micrometer index. The vertical feed is actuated by hand on all standard machines, but, on the 17 in. Double Geared and larger sizes, if required, it can be made automatic at an extra cost. The tool post can be set to any angle and the flapper box is also arranged to swivel, in order to give the proper rake to the tool.

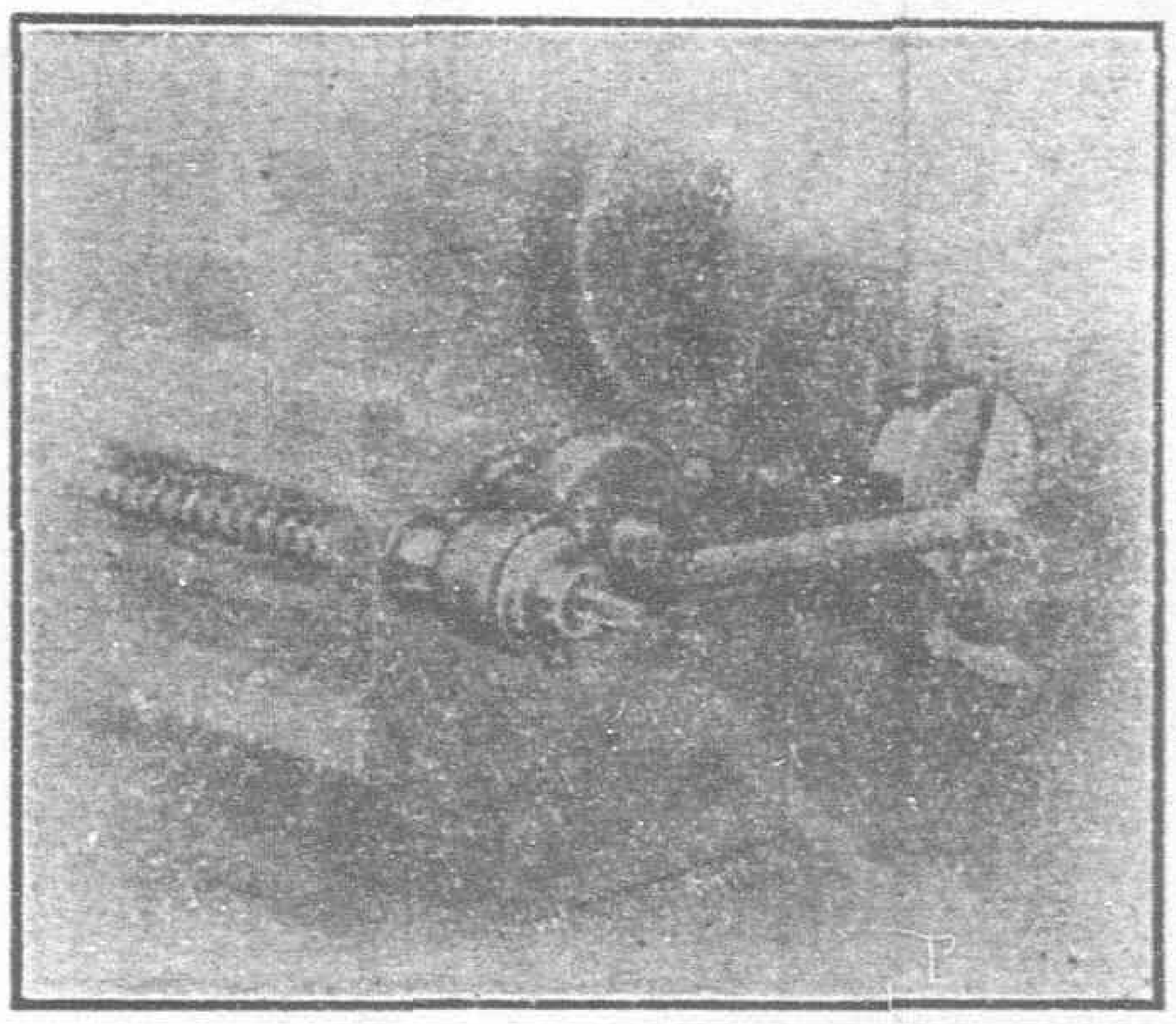
The Main Driving Link, or rocker arm, is connected to the ram by a short link which gives a **draw stroke and ensures a smooth cutting motion.** The crank pin block is so arranged that there is no overhang between the large driving wheel and the link, thus avoiding undue side strains. The sliding block is carefully scraped dead parallel with its slide and provision made for taking up the wear.

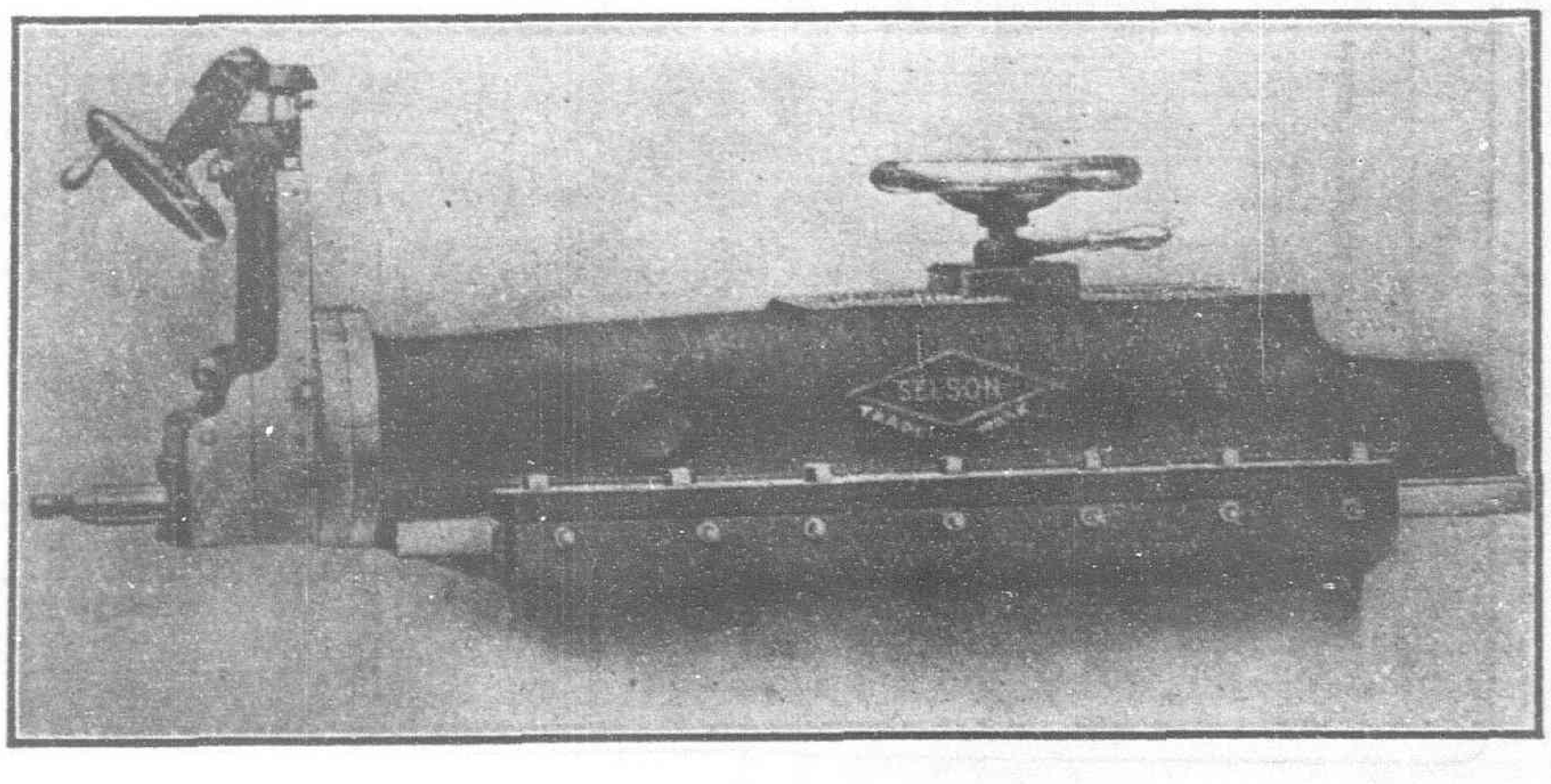
The Stroke can be altered to any position by a crank handle **when the machine is running or stationary.** This handle also controls a pointer which registers the exact length of stroke **on a stationary index placed on the feed bracket in full view of the operator** (see illustration). This arrangement will be found much more convenient and accurate than the customary one where the index is placed on the moving ram.



The Table Cross Slide is vertically adjustable by hand on the main frame, the guides being square and of good width. The screw for the vertical movement is non-rotating for the smaller sizes, but for 21 in. and upwards, for which this design is impracticable, it is of the telescopic pattern, both arrangements being such that no portion of the machine projects at any time below the floor line, so that the machine can be placed in any convenient position in the shop without considering a hole in the foundation.

The Cross Feed is of a special design, (Patent applied for), and, on the 17 in. Double Geared Machine and upwards, is so arranged that **the whole of the feeding mechanism can, by depressing a hand lever, be thrown out of action when the machine is running**

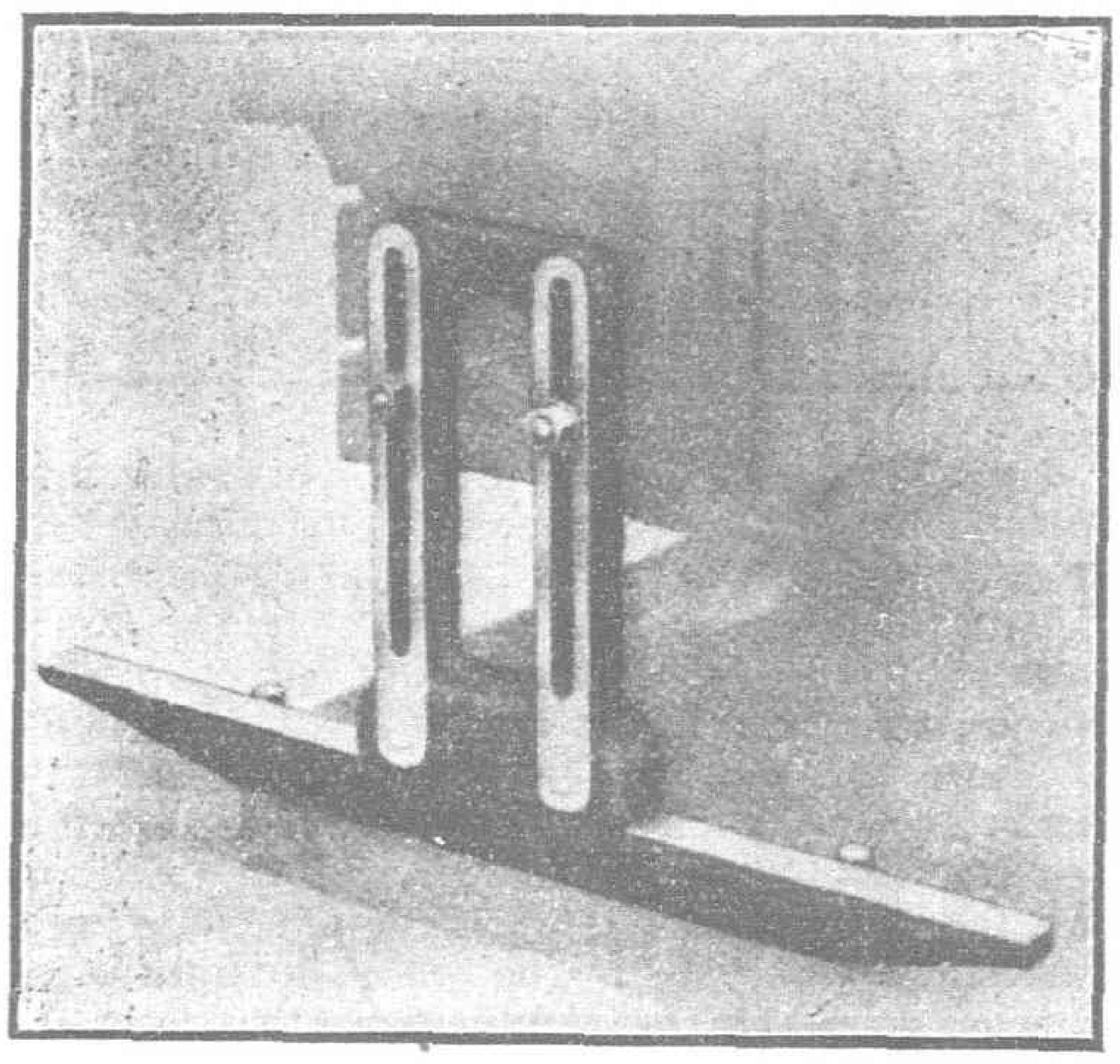




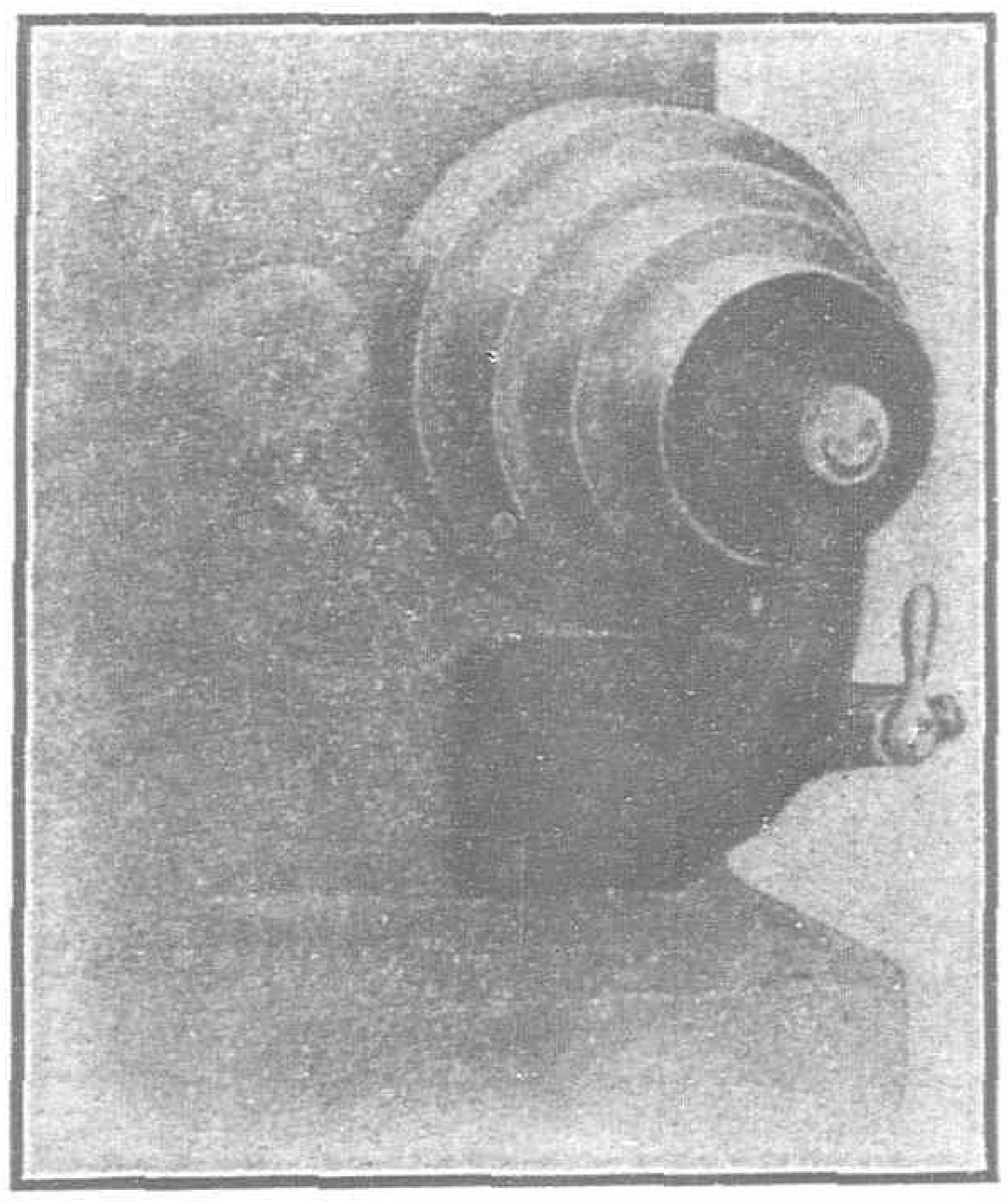
THE RAM

at any speed. This is of special importance, as the feed can then be altered or reversed with perfect safety without disturbing the driving mechanism, **a feature which is not found on any other machine of this type.** The rates of feed are indicated by a pointer and index, and, after the alteration has been made, **the feed mechanism, by a partial turn of a knob, is automatically set again in motion.** The cross slide screw is fitted with a micrometer index for accurate adjustment and a safety device is introduced, which prevents any breakage of the feed mechanism, should the operator, through carelessness, omit to stop the feed before the table slide has reached the end of its traverse. The feed bracket is free to swing on the main driving wheel bearing and connected to the vertical slide in such a manner that the feed connecting rod always remains at a workable angle.

The Table is of ample proportions and has milled slots on the top and sides for holding the vice or work; these are of the same centres throughout, so that the vice or special jigs can be used equally well on the three surfaces. The back is carefully scraped to bed on the table slide, in order to avoid distortion when clamping up, and a vertical groove, for setting shafts or cylindrical objects, is planed in one of the sides. The front of table slide is also provided with milled slots, so that objects of special size or shape can be bolted to it after the table has been removed.

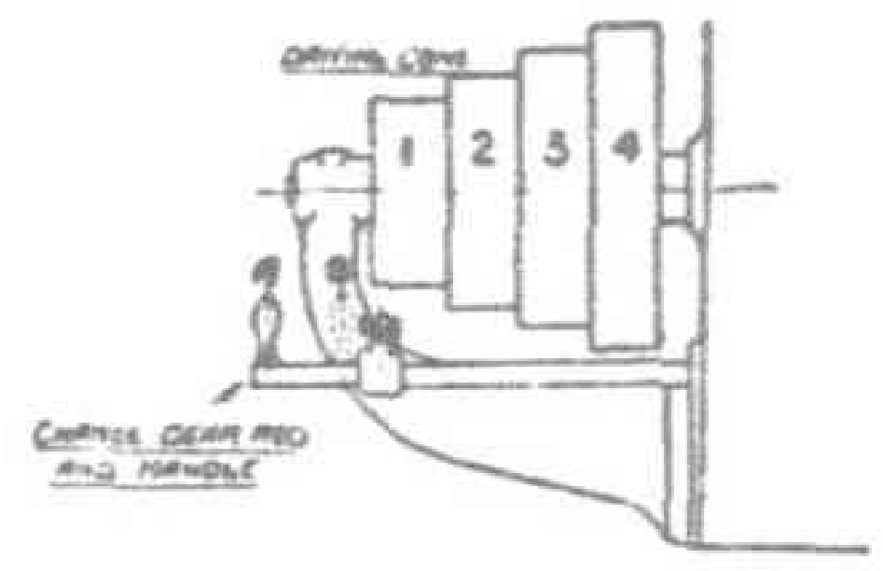


The Table Support, which has a wide base to prevent undue overhanging strains, when the cut is on the outside of the table, is arranged to slide on rollers to minimise the friction and provided with felt wipers to prevent cuttings getting between the rollers and bearing, which would cause spring and inaccuracy. It is brought further to the front than is usual with machines of this type and firmly locked to the table by strong bolts. Special attention is paid to the bearing on the base being exactly parallel with the guide on the vertical slide for the table, as, if there be an inaccuracy in these parts, exact work is impossible. This support is included in all machines from 17 in. Double Geared upwards, but we do not consider it necessary for the smaller sizes.



The Drive for the standard machine is by 4-speed cone pulley for all sizes. Up to and including the 17 in. Double Geared machine the driving shaft bearing is carried well inside the pulley, to prevent overhanging strains, whilst an additional outside bearing is provided on the larger machines. When desired, a gear box with motor or single belt drive, may be substituted for the cone pulley. The driving shafts are ground truly cylindrical at their bearings and run in bushes which can be easily replaced.

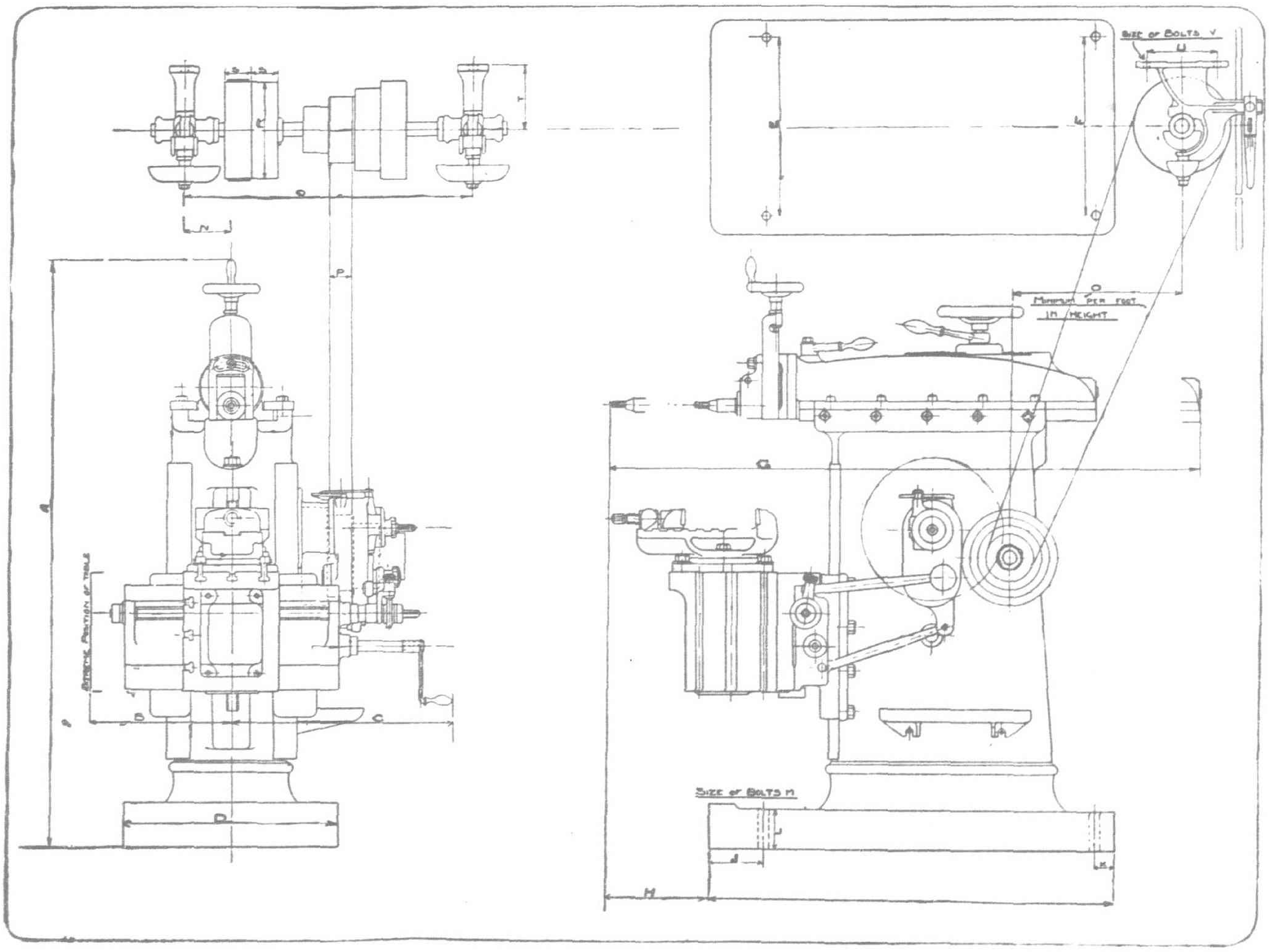
25IN. STROKE SHAPING MACHINE.



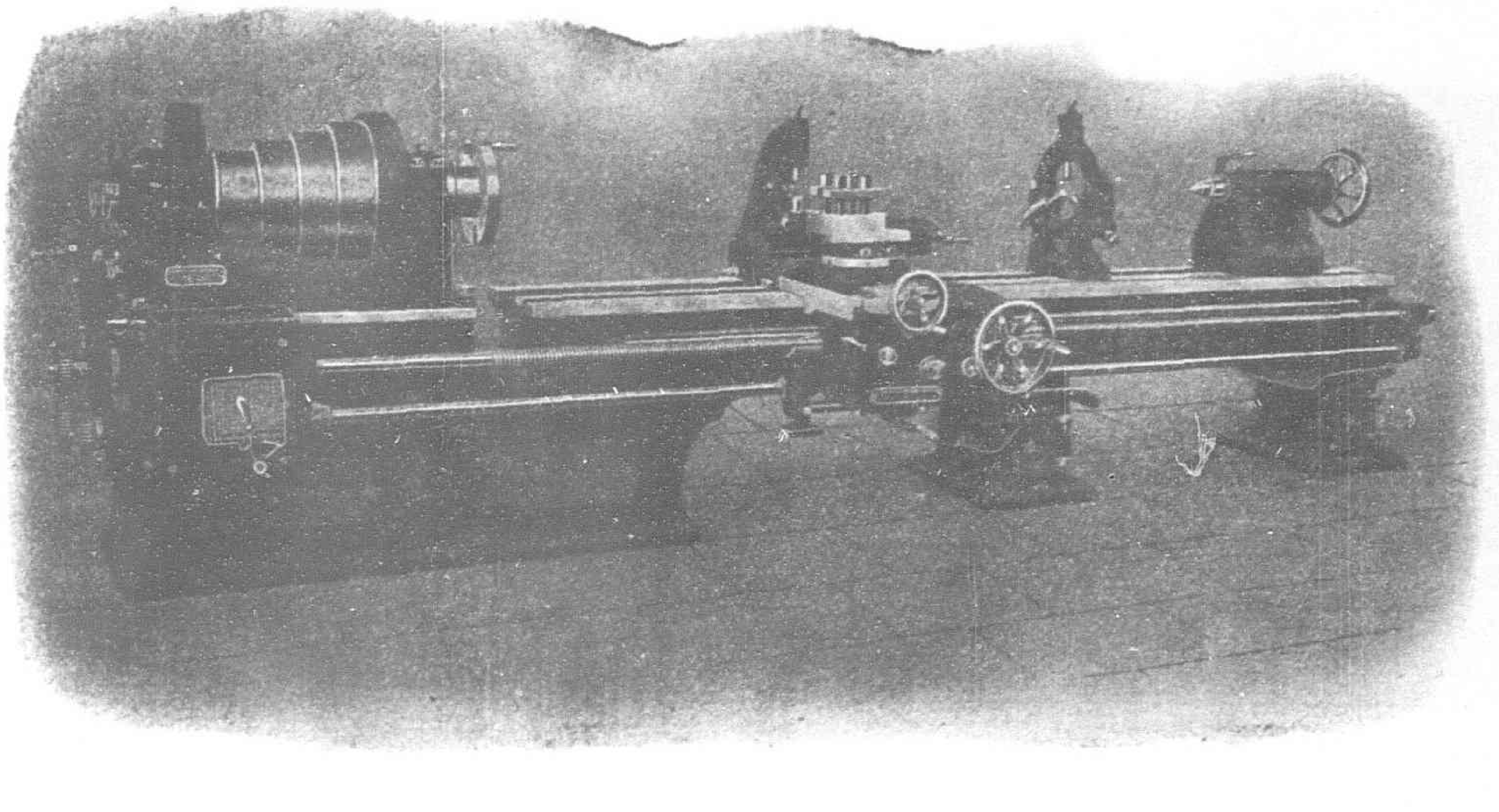
Length of Stroke in inches.	CUTTING SPEED IN FEET PER MINUTE.							
	Gear Change Handle at A				Gear Change Handle at B			
	No. of Speed on Cone.				No. of Speed on Cone.			
	1	2	3	4	1	2	3	4
3	40	28	18	12	—	—	—	—
6	74	50	35	23	14	10	—	—
9	110	74	50	34	22	14	10	—
12	—	95	67	44	29	19	14	—
15	—	117	77	54	34	23	15	11
18	—	—	93	63	41	28	18	13
21	—	—	109	73	46	32	21	14
25	—	—	130	85	55	37	27	17

Speed of Countershaft 280 revolutions per minute.

The Double Gear, so called, which is, in reality, two gears of low and high ratio, can be



SELSON STANDARD SHAPING MACHINE



SELSON HIGH SPEED LATHE

easily and quickly changed by a handle brought to the front well clear of the belt, so that it is in a perfectly safe position for the operator, and does not, in the slightest degree, limit the position of the countershaft.

A Speed Table is supplied with each machine, showing the correct position of belt and gear shifting handle for various strokes at any desired speed. It does not state the revolutions or number of strokes per minute as, for practical purposes, this is quite unnecessary. All the operator has to do is to select the amount of stroke and cutting speed and find from the table which step of the cone and gear to use. This table is also of great value to the foreman or overlooker, **as he can see, at a glance, if the machine is being run at its proper speed.**

The Vice, which is supplied with every machine, is arranged with a graduated base so that it can be quickly set to any desired angle. The movable jaw can be quickly adjusted to suit varying widths of work and is arranged to swivel, so that **it can be used equally well for parallel or taper objects.** The jaws are made of mild steel and are firmly held in position by strong screws. As the centres of the table slots are the same throughout, the vice can be applied equally well to the top and sides of the table.

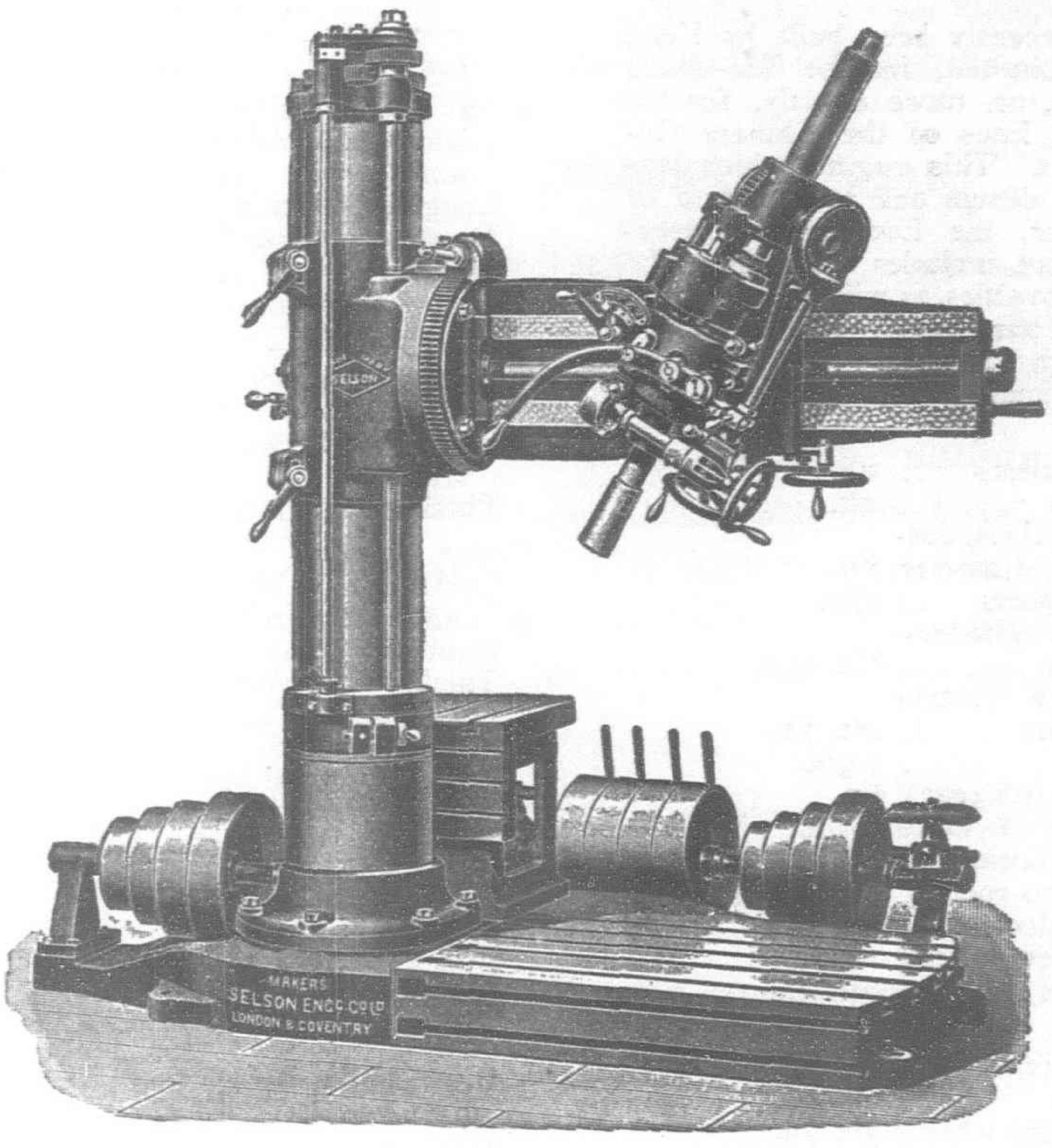
The Countershaft is fitted with oil-retaining bearings, rendering frequent attention unnecessary. It can be placed in any desired position, as the angle of belt is practically unlimited.

The Oiling Arrangements have been carefully considered and are most complete, giving no excuse to the workman for ignorance or neglect. Lubricators or dust-proof covers are fitted throughout t all bearings for revolving parts and placed in easily accessible positions.

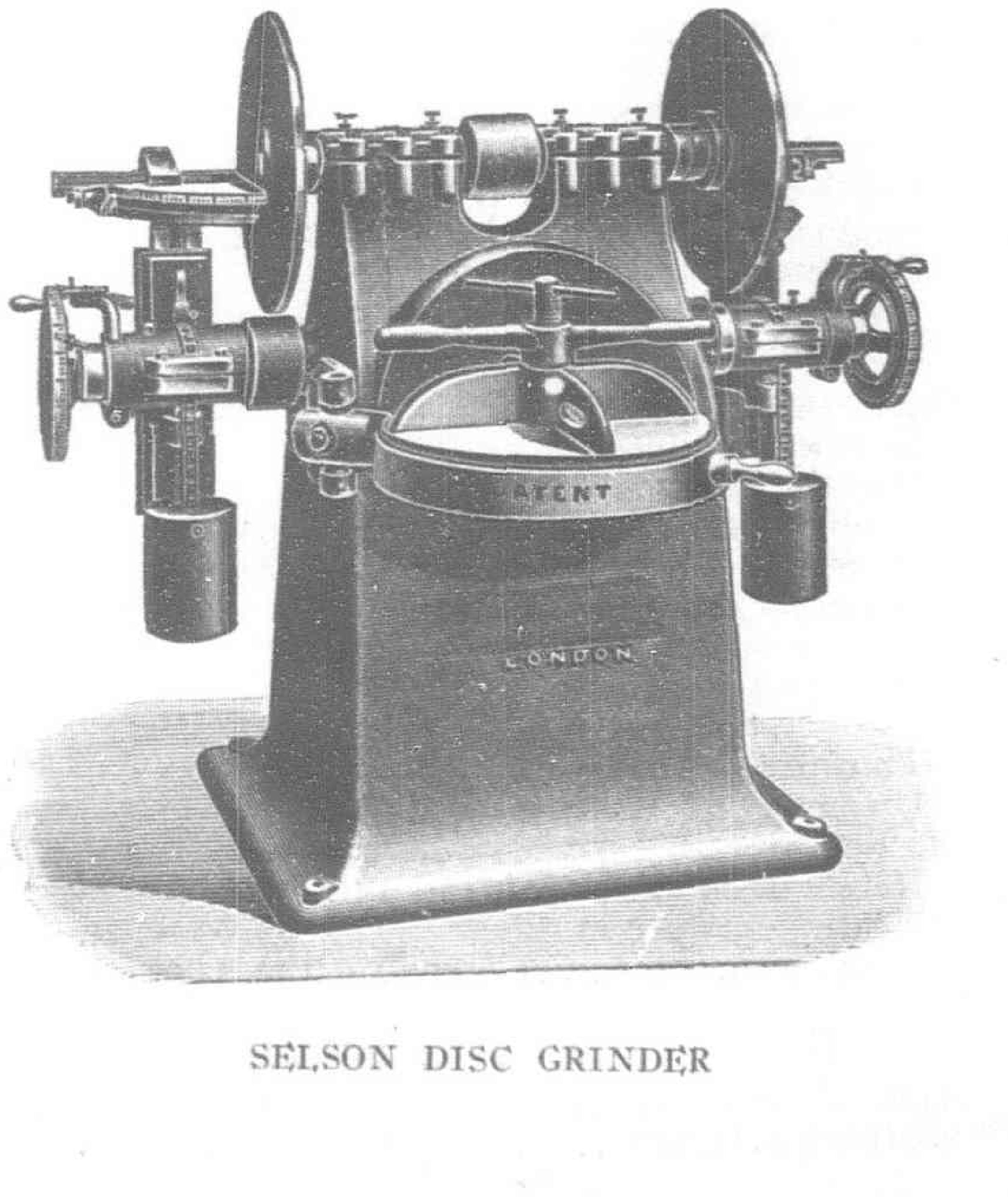
The Accessories supplied with each machine comprise Vice, Countershaft, Tool Tray, arranged to bolt on main frame, all necessary Handles and Wrenches, Speed Table and Table of Instructions for the manipulation of the machine.

These tools together with Radial Drilling Machines (both Central-Thrust and Universal) and High Speed Lathes (cone drive and all geared) are specialities of the Company and are made at their new and well equipped works at Coventry. The Central Thrust Radial is made under a patent of the firm's and a good demand has already been found for this tool, which is made in two sizes viz.: 4′ 6″ and 6′ radius.

Other specialities made at their Coventry works are Patent Brass Finishers' Lathes, on which four different pitches, (internal and external), can be cut by simply revolving a turret carrying the hobs and tools—Upright Drilling Machines and Disc Grinders, the latter being fitted with patent press.



SELSON RADIAL DRILLING MACHINE



SELSON DISC GRINDER

In additon to the above named tools the Company have a number of other specialities made solely for them from their own designs and are in a position to supply all descriptions of Engineers' Machine and Hand Tools and accessories, of which they publish a very complete catalogue, (latest issue 1911), a copy of which will be sent on application to intending purchasers in the Fast East.

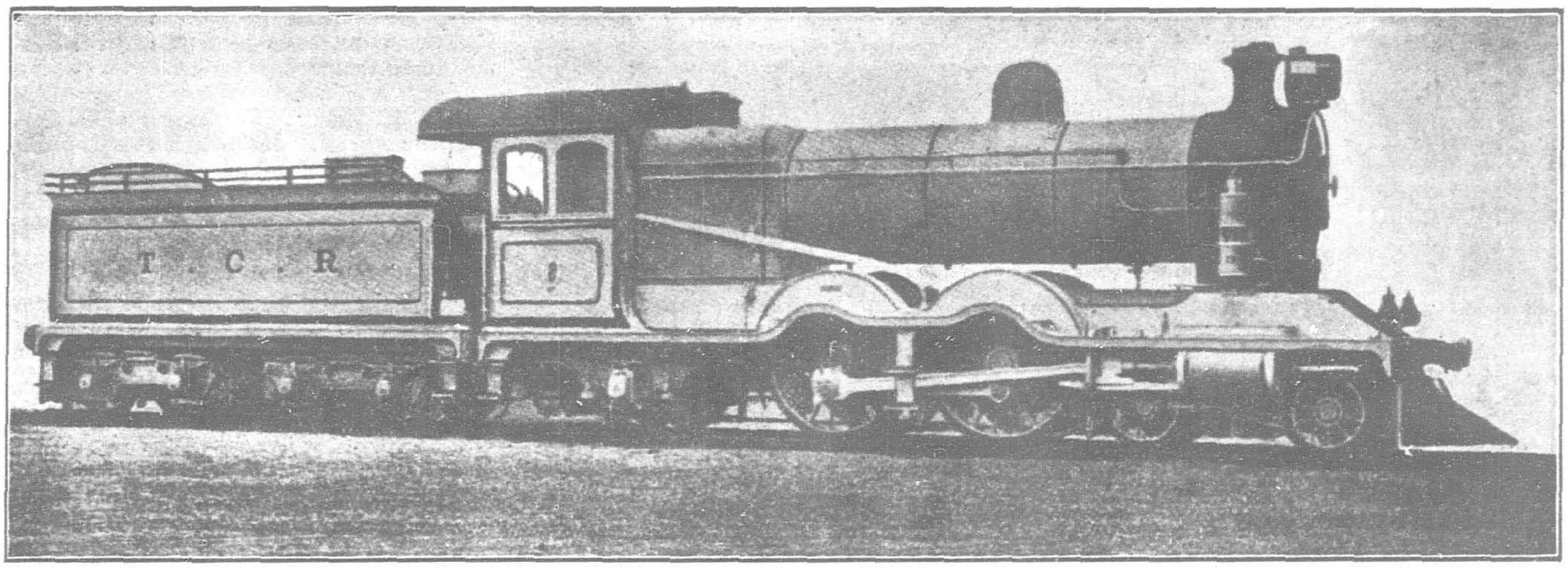
Building Activity in Tsingtao.—Tsingtao is experiencing a substantial building boom, no less than 250 buildings being in the course of erection. This is due to the influx of Chinese ex-officials, who have taken up their homes in Tsingtao under the protection of the German Government, which has rescinded in their favor, a regulation heretofore confining all Chinese to a certain section of Tsingtao called Tapatao. All Chinese of the better class, after an investigation of their standing and capacity, are now permitted to own property and live among the better class of foreign residents.

As the vacant lands are owned by the Government, and are sold to the highest bidder after a price limit is set upon the property, the income from land sales recently has been considerable.

Quingua River Bridge Tenders.—The directors of the Bureau of Public Works, opened the bids for the construction of the substructure and the erection of the superstructure of the Quingua River Bridge, and the following bids were submitted.

(a) Insular Construction Company, ₱43,231.60; John Gordon, ₱38,800.00, Atlantic, Gulf and Pacific Company, ₱39,465,50; (a) A. F. Allen, ₱43,726. Delmar Smith Clinton, ₱48,530. The bridge will be of three 39.62 meters (130 feet) steel spans on concrete piles and abuttments. The Atlantic, Gulf and Pacific Company have been awarded the contract for the fabricated steel for the super-structure by the province.

Perak River.—The Perak (Federated Malay States) Chamber of Commerce have asked the Government to consider a suggestion for bridging the Perak river at Parit, where at present there is only an old ferry,



ATLANTIC TYPE EXPRESS LOCOMOTIVE FOR THE CHINESE GOVERNMENT RAILWAYS.

An engine has recently been built by Kerr, Stuart and Co., Limited, for the Tao-Ching Railway, in China, or, more exactly, for the Taokou-Ching-hua lines of the Chinese Government Railways. This engine, which was constructed to the design and specification of Mr. Donald Fraser, the Locomotive Superintendent of the line, includes more than the usual number of novelties, as will be seen from the following list of particulars. The engine and tender loaded weigh 120 tons. The following are its leading particulars:—

Cylinders—	
Diameter of cylinders ..	19in.
Stroke of pistons	2ft.
Cast iron piston valves, outside admission, diameter	8in.
Width of steam ports ..	$1\frac{3}{8}$in.
Distance apart of cylinders, centre to centre	6ft. $9\frac{1}{2}$in.
Distance between centres of valve spindles	2ft. 3in.
Lap of valve	$1\frac{1}{8}$in.
Lead of valve (in full gear)	$\frac{3}{8}$in.
Maximum travel of valve	$4\frac{1}{16}$in.
Stephenson link motion ..	
Diameter of piston-rod ..	$3\frac{1}{2}$in.
Length of slide blocks ..	1ft 9in.
Length of connecting-rod between centers	10ft. 9in.

Wheels (steel)—	
Diameter of driving and coupled wheels	6ft.
Diameter of trailing wheels	3ft. 7in.
Diameter of bogie wheels ..	3ft.
Thickness of all tires on tread	3in.
Width of all tires on tread	$5\frac{1}{2}$in.
Distance from centre to centre of driving wheels	6ft. 6in.
Centres of bogie wheels ..	6ft. 4in.
Centres of driving wheel to centre of trailing wheel	8ft. 7in.
Distance from centre of driving wheel to front of fire-box	2ft. 6in.

Axles (steel—	
Driving and coupled diameter of wheel seats	$8\frac{3}{4}$in.
Driving and coupled diameter of bearings	8in.
Driving and coupled length of bearings	9in.
Driving and coupled diameter at centre	$7\frac{3}{4}$in.
Centre to centre of all bearings	3ft. $7\frac{1}{2}$in.
Trailing axle diameter of wheel seat	8in.
Trailing diameter of bearings inside and outside ..	7in and $6\frac{1}{2}$in.
Trailing length of bearings inside and outside	9in. and 11in.
Trailing diameter at centre	$6\frac{3}{4}$in.
Trailing centre to centre of outside bearings	6ft. 7in.
Bogie axles, diameter of wheel seat	$6\frac{3}{4}$in.
Bogie axles, diameter of bearings	6in.
Bogie axles, length of bearings	9in.
Bogie axles, diameter at centre	$5\frac{7}{8}$in.

Crank pins (steel)—	
Diameters of driving crank pin	6in. and $6\frac{3}{4}$in.
Lengths of bearings	$5\frac{1}{2}$in. and 4in.
Diameter of coupled crank pin	$5\frac{1}{4}$in.
Length of bearing	4in.

Frames (steel)—	
Distance between frames	4tt. $0\frac{1}{4}$in.
Thickness of frames ..	$1\frac{1}{4}$in.
Distance between bogie frames	2ft. $8\frac{1}{4}$in.
Thickness of bogie frames	1in.

Boiler (steel)—	
Centre of boiler from rail	9ft. 4in.
Length of barrel (parallel)	15ft. 10in.
Diameter of barrel oustide	4ft. 9in.
Thickness of plates	$\frac{9}{16}$in.
Longitudinal butt joints, treble riveted	
Circumferential butt joints, double riveted	
Thickness of smoke-box tube plate	$\frac{3}{4}$in.

Fire-box (steel)—	
Length outside	8ft. 10in.
Breadth outside at bottom	5ft. 2in.
Depth below centre line at front end	4ft. 3in.
Depth below centre line at back end	3ft. 2in.
Thickness of front plate ..	$\frac{5}{8}$in.
Thickness of back plate ..	$\frac{9}{16}$in.
Thickness of sides and top	$\frac{1}{2}$in.

Internal fire-box (steel)—	
Length at bottom, inside ..	7ft. $11\frac{5}{16}$in.
Breadth at bottom, inside	4ft. $4\frac{3}{8}$in.
From top of box to inside of shell	1ft. $6\frac{1}{8}$in.
Depth of box inside at front	5ft. 3in.
Depth of box inside at back	4ft. 2in.
Diameter of Low Moor iron stays	$\frac{7}{8}$in.
Distance of stays apart ..	$3\frac{3}{4}$in.

Tubes (steel zinced)—	
Number of tubes	193
Length of tubes between tube plates	16ft. $2\frac{5}{8}$in.
Diameter outside of tubes	$2\frac{1}{4}$in.
Diameter outside of tubes at smokebox end	$2\frac{5}{16}$in.
Diameter outside of tubes at fire-box end	$2\frac{1}{8}$in.
Thickness of tubes	11 w.g.
Diameter of exhaust pipe nozzle	5in.
Height of chimney from rail	14ft. $5\frac{1}{2}$
Heating surface in tubes ..	1843. 65 sq. ft.
Heating surface in fire-box ..	132. 35 sq. ft.
Total	1976 sq. ft.
Area of fire-grate	35 sq. ft.
Working pressure	180 lb. per sq. in.

Tender wheel base—	
From front buffer beam to front bogie centre	6ft. 6in.
From front to hind bogie centres	11ft.
From hind bogie centres to back buffer beam	5ft. 1in.
Centre to centre of bogie wheels	5ft.

Wheels (steel)—	
Diameter of wheels on tread	3ft. 1in.
Thickness of tires	3in.
Width of tires	$5\frac{1}{2}$in.

Axles (steel)—	
Diameter of bearings	$5\frac{1}{4}$in.
Length of bearings	9in.
Diameter of wheel seats ..	$6\frac{3}{4}$in.
Length of wheel seats ..	6in.
Distance between centres of bearings	6ft. 4in.

Frames (steel)—	
Distance between frames ..	6ft. $1\frac{1}{2}$
Thickness of frames	$\frac{7}{8}$in.
Distance between bogie frames	5ft. $9\frac{1}{4}$in.
Thickness of bogie frames	$\frac{7}{8}$in.

Capacity of tank	4250 gollons
Capacity of coal space	8 tons
Tractive force	19,277 lb.
Tractive force per ton of adhesive weight	507 lb.

Weights—	Tons.	cwt.
Weight of engine in working order:		
On bogie wheels	15	10
On coupled wheels	38	0
On trailing wheels	17	17
Total	71	7
Weight of engine empty ..	65	1
Weight of tender in working order (front bogie)	24	2
On hind bogie	24	11
Total	48	13
Weight of tender empty ..	21	13
Total weight of engine and tender in working order	120 tons	

The engine is fitted with the following:—Westinghouse quick-acting automatic brake; Westinghouse steam heating apparatus for carriages; Holden and Brooke's steam sanding apparatus fitted in front of leading coupled wheels; Gresham's No. 9 combination injectors; the boiler and cylinders are clothed with the Cape Asbestos Company's Pluto brand mattresses, and the piston-rods and valve spindles are fitted with the United Kingdom Metallic Packing Company's packings; Laycock's patent combination automatic couplers; the Dayton Manufacturing Company's acetylene gas head lamp, with "Mosher" gas generator enclosed in anti-freezing cabinet and fitted with purifier; and Smith's patented combined lubricator and cylinder vacuum destroying valves.

CHINESE GOVERNMENT RAILWAYS

PEKING-MUKDEN LINE

Tenders are invited for the following:—

INDENT No. 2111.

281,000 Japanese Sleepers 8′×9″×6″ of Nara, Yachitamo or Katsura.

Quality.—The quality of timber must be uniformly good, free from shakes, excessive knots, sapwood, twist, pickmarks or other defects. All must be Winter cut *i.e.* felled between 1st November, 1912, and 1st March, 1913. Two (2) full-sized samples of each timber to accompany Tender, which otherwise will not be entertained.

Delivery.—To be delivered as follows:—

(*a*) 170,000 on Hsinho Wharf.

(*b*) 111,000 on Yingkow Wharf.

(*a*) First consignment of not less than 25,000 to be delivered not later than 1st April, 1913. The balance to be delivered before the 1st August, 1913, in consignments of not less than 25,000 per month.

(*b*) First consignment of not less than 25,000 to be delivered not later than 1st April, 1913. The balance to be delivered before the 1st July, 1913, in consignments of not less than 25,000 per month.

A penalty of One Tael Cent (Tael 0.01) per Sleeper per day will be imposed for each day of delay.

INDENT No. 2112.

4,350 Japanese Crossing Timbers, as under:—

800	Crossing	Timbers.........	9′ 0″×9″×7″
700	,,	,,	.........10′ 0″×9″×7″
625	,,	,,	.........11′ 0″×9″×7″
650	,,	,,	.........12′ 0″×9″×7″
770	,,	,,	.........13′ 0″×9″×7″
440	,,	,,	.........14′ 0″×9″×7″
180	,,	,,	.........15′ 0″×9″×7″
155	,,	,,	.........17′ 0″×9″×7″
30	,,	,,	.........18′ 0″×9″×7″
Total...4,350.			

Quality.—The whole of the above to be either of best quality Yachitamo or Nara (White Oak) *i.e.* not a mixture of both. To be Winter cut *i.e.* felled between 1st November, 1912, and 1st March, 1913. To be uniformly good, free from shakes, excessive knots, sapwood, twist, pickmarks or other defects. Full-sized 9 feet sample to accompany Tender, which will not be entertained otherwise.

Delivery.—To be delivered on Railway Wharf, Hsinho, not later than 1st May, 1913.

A penalty of Two Tael Cents (Tael 0.02) per Crossing Timber per day will be imposed for each day of delay.

INDENT No. 2113.

7,100 Bridge Ties 10′ 0″ × 9″ × 8″ of Oregon Pine or Japanese White Oak (Nara). To be sawn on all four sizes strictly in accordance with above measurements.

Quality.—The timber must be uniformly good, free from shakes, excessive knots, sapwood, twist, pickmarks or other defects and must be Winter cut *i.e.* felled between 1st November, 1912, and 1st March, 1913. Full-sized samples to accompany Tender, which will not be entertained otherwise.

Delivery.—All to be delivered on Hsinho Wharf, not later than 1st May, 1913.

A penalty of Two and a half Dollar Cents ($0.02½) will be imposed per Tie for each day of delay.

Quotations.—All quotations to be in Local Currency Dollars.

Inspection.—The above Timbers will be subject to a rigid examination by a Railway Engineer at Hsinho or Yingkow, and will be rejected if not in accordance with the Railway requirements.

Tenders must be addressed to the Managing Director, Chinese Government Railways, Peking-Mukden Line, Tientsin, and marked **Tender for Sleepers, Crossings and Ties,** Indents Nos. 2111, 2112 and 2113, which will be opened at 11 o'clock a.m. on Friday, 6th December, 1912.

Specification forms of Tender may be obtained on application to the above address. No Tender will be entertained unless made upon the forms thus obtained.

The Managing Director does not bind himself to accept the lowest or any tender.

LI TSOI CHEE,
Managing Director.

Tientsin, 7th October, 1912.

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Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.
Shewan, Tomes & Co.
U. S. Steel Products Co.
Western Electric Co.

Electrical Supplies
American Trading Co.
Anderson, Meyer & Co.
Arnhold, Karberg & Co.
Jardine, Matheson & Co.
Babcock & Wilcox (D. W. Bell)
Bellis & Morcom (D. W. Bell)
Fearon, Daniel & Co.
General Electric Co.
Melchers & Co.
Shewan, Tomes & Co.
Siemens China Electric Eng. Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.
Western Electric Co.

Engines
Bellis & Morcom (D. W. Bell)
Shanghai Dock & Engineering Co., Ltd.

Excavators and Elevator
Priestman Bros. Ltd.
Rose, Downs & Thompson, Ltd.
Shanghai Dock & Engineering Co., Ltd.
Austin Drainage Excavator Co.

Explosives
Jardine, Matheson & Co.
Arnhold, Karberg & Co.
Rendrock Powder Co.

Feed Water Heaters
Babcock & Wilcox Ltd.

Food Products
Anderson & Co., W. H.

Gas Engines
Shanghai Gas Co., Ltd.
Melchers & Co.
Campbell Gas Engine Co., Ltd., The

Hotels
Astor House Hotel Co.
Salween House & Tenasserim House

Ice Machinery
Vulcan Iron Works
Melchers & Co.

Insurance
Stevenson & Co., Ltd., W. F.

Life Insurance
China Mutual Life Insurance Co., Ltd.

Locks
Yale & Towne Mfg. Co.

Lubricants
Albany Lubricating Co.

Lumber Dealers
Robert Dollar Co.
China Import Export
Jardine, Matheson & Co.
Port Banga Lumber Co.

Machinery Merchants
Anderson, Meyer & Co.
Arnhold, Karberg & Co.
Shanghai Machine Co.
Fearon, Daniel & Co.
Frank L. Strong
Schuchardt & Schutte.
Shanghai Dock & Engineering Co., Ltd.
Samuel & Co., Ltd.
Tulloch & Co.

Mill Machinery
Rose Downs & Thompson Ltd.
Shanghai Dock & Engineering Co., Ltd.

Mining Machinery
American Trading Co.
Melchers & Co.
Shanghai Dock & Engineering Co., Ltd.
Shewan, Tomes & Co.

Motors
Shanghai Dock & Engineering Co., Ltd.
Pratt's

Motor Launches
Shanghai Dock & Engineering Co., Ltd.

Paints Oils and Varnish
Standard Oil
Albany Lubricating Co.
F. A. Vander Loo & Co.

Packing
Greene Tweed & Co.

Pulleys (Steel)
Schuchardt & Schütte
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.

Pumps
The Goulds Manufacturing Co.
Shewan, Tomes & Co.
Jardine, Matheson & Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.

Railroads
Chinese Government Railways
Manila Railroad Co.
South Manchuria
Southern Pacific Co.
Chosen (Korea) Railways.

Railroad Supplies
American Trading Co.
American Locomotive Co.
Anderson, Meyer & Co.
Arnhold, Karberg & Co.
Baldwin Locomotive Work.
Fearon, Daniel & Co.
Hannoversche Maschinenbau A. G. Vormals Georg Egestorff.
Henschel & Sohn.
P. Herbrand & Co.
Jardine, Matheson & Co., Ltd.
Melchers & Co.
Mitsui Bussan Kaisha
Shewan, Tomes & Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co., Ltd.
Tyer & Co.
U. S. Steel Products Co.
Railway Signal Co., Ltd., The
Robert Dollar Co.
Samuel & Co., Ltd.

Reinforced Concrete Construction
Shanghai Dock & Engineering Co., Ltd.
Trussed Concrete Steel Co.
U. S. Steel Products Co.

Roofing Paper
California Manila Lumber Commercial Co.

Rope Manufacturers
Johnson-Pickett Rope Co.
U. S. Steel Products Co.
Ynchausti & Co.
Shewan Tomes & Co.

Ship-Chandlery
Ynchausti & Co.

Shipping Agents
Cia. General de Tabacos
Shewan, Tomes & Co.
Stevenson & Co., Ltd.

Shipbuilding and Repairs
Fiat-san Giorgio Ltd.
Tsingtauer Werft
Hongkong & Whampoa Dock Co., Ltd.
Kiangnan Dock and Engineering Co., Ltd.
Mitsu Bishi Dock and Engineering Works
Shanghai Dock and Engineering Co., Ltd.
Smith's Dock Co., Ltd.
The Taikoo Dockyard and Engineering Company of Hongkong, Limited
William Cramp & Sons.

Steamship Companies
Cia. General de Tabacos
Pacific Mail S. S. Co.
Ynchausti & Co.
Toyo Kisen Kaisha.

Steel Manufacturers
United States Steel Products Export Co.

Steel Works
Bohler Bros. & Co., Ltd.
U. S. Steel Products Co.

Stokers
Babcock & Wilcox Ltd.

Structural Steel
Bohler Bros. & Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.

Sugar Machinery
Honolulu Iron Works.

Superheaters
Babcock & Wilcox Ltd.

Tanks
Pacific Tank and Pipe Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.

Telephones
The Western Electric Co.

Tiles and Bricks
Green Island Cement Co., Ltd.
Chinese Eng. Mining Co.

Tobacco Dealers
British-American Tobacco Co., Ltd.
Cia. General de Tabacos
Olsen & Co., Walter E.

Tools
American Tool Works Co.
Lodge & Shipley Machine Tool Co.
Shanghai Machine Co.
Easterbrook Allcard & Co., Ltd.
The Selson Engineering Co., Ltd.
Shanghai Dock & Engineering Co., Ltd.

Windmills
Defiance Machine Works.

Water Softeners
Babcock & Wilcox Ltd.

Wood Working Machinery
American Tool Works Co.
Defiance Machine Works.
Lodge & Shipley Machine Tool Co.
Shanghai Dock & Engineering Co., Ltd